



सत्यमेव जयते

**REPORT**  
OF THE  
**TARIFF COMMISSION**  
ON THE  
**POWER AND DISTRIBUTION  
TRANSFORMER INDUSTRY**

BOMBAY  
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# CONTENTS

Para.	Page
1. Reference to the Commission. . . . .	1
2. Terms of reference . . . . .	2
3. Method of inquiry. . . . .	3
4. Scope of the inquiry . . . . .	5
5. History of the industry. . . . .	6
6. Process of manufacture . . . . .	6
7. Uses of power and distribution transformers. . . . .	8
8. Domestic demand. . . . .	9
9. Rated capacity . . . . .	12
10. Domestic production. . . . .	12
11. Raw materials. . . . .	16
12. Imports and import control policy. . . . .	36
13. Quality of indigenous transformers . . . . .	37
14. Period of delivery . . . . .	40
15. Existing rate of import duty . . . . .	41
16. Commission's estimate of fair ex-works costs of transformers . . . . .	41
17. Comparison of landed costs of imported trans- formers and fair ex-works costs of indigenous transformers . . . . .	45
18. Eligibility for protection . . . . .	46
19. Measure of protection. . . . .	46
20. Other assistance . . . . .	48
21. Conditions for protection. . . . .	49
22. Changes in the Indian Customs Tariff . . . . .	49
23. Summary of conclusions and recommendations . . . . .	49
24. Acknowledgements . . . . .	53

GOVERNMENT OF INDIA  
MINISTRY OF COMMERCE AND INDUSTRY

RESOLUTION  
(Tariffs)

*New Delhi, the 30th May, 1953.*

No. 11(1)-T.8./51.- The Tariff Commission has submitted its report on the Power and Distribution Transformer industry, on the basis of an enquiry under Section 11(i) (a) of the Tariff Commission Act, 1951. Its recommendations are as follows:-

- (1) The import duty on power and distribution transformers upto 2,500 KVA and 37.5 KV on the H.T. side (primary voltage being over 250) excluding furnace, rectifier and flame-proof transformers should be increased from the present level of 5% *ad valorem* to 10% *ad valorem* exclusive of surcharge and should be converted into a protective duty. The protective duty should remain in force upto 31st December, 1955.
- (2) The domestic producers of transformers should be given a refund of so much of the customs duty on transformer oil as is in excess of 5½% *ad valorem* on the quantity of transformer oil actually used by them in the manufacture of transformers. If, however, there are serious administrative difficulties in operating this refund, transformer oil imported with transformers should be assessed at the rate of duty applicable to transformer oil imported separately.
- (3) No reduction is recommended in the import duties on silicon steel sheets, copper wires and strips, cooling tubes, bushings, insulating materials (insulating paper, bakelite tubes, leatheroid, elephantide, press-pahn, etc.), miscellaneous components like silica gel breathers, thermometers, etc.
- (4) The grant of protection to this industry should be subject to the conditions that the industry will

maintain its prices at a reasonable level, strive for reduction in costs and improvement in quality and endeavour to meet the domestic demand for the types of power and distribution transformers covered by this inquiry to the fullest possible extent.

- (5) Imports of power and distribution transformers should in future be recorded separately in trade statistics by numbers and the total KVA, as well as by value, and should be classified by voltages on the H.T. side and by ratings.
- (6) Imports of stalloy sheets and laminations should be so regulated as to promote a fuller utilization of the domestic capacity for the production of these materials.
- (7) The present system of import restrictions, though imposed for balance of payments reasons, has been of much benefit to this industry. So long as the quality of domestic transformers continues to be satisfactory and the prices and delivery periods are reasonable, import restrictions should be so administered as to ensure the fullest utilization of domestic capacity.
- (8) The Development Wing of the Ministry of Commerce and Industry should carry out a technical investigation of the extent of facilities available at each unit, with a view to obtaining more accurate data about the highest ratings upto which transformers can be produced by each unit.
- (9) The Central Glass and Ceramic Research Institute, Calcutta, should try to bring about an improvement in the quality of indigenous bushings by giving the porcelain factories necessary technical advice and assistance.
- (10) The Central and State Governments should adopt a policy of purchasing their requirements of transformers from indigenous producers as far as possible. The major electric supply undertakings should also be requested to adopt a similar policy.
- (11) The Government of Mysore should make every effort to expedite the completion of their scheme for the expansion of the porcelain factory at Bangalore.
- (12) The prices quoted by the Sankey Electrical Stampings for transformer laminations are reasonable, but the

(iii)

firm should try to reduce the percentage of wastage in the manufacture of laminations with a view to reducing its costs.

- (13) The prices charged by the Indian Cable Co., for DCC and DPC wires and strips and those charged by the National Insulated Cable Co., for DCC wires are excessive. The two companies should be asked to reduce their prices, so as to bring them in fair relation to their costs. Government should keep a watch over the prices of indigenous DCC and DPC wires and strips with a view to ensuring that they are maintained at a reasonable level.
- (14) Some of the manufacturers of transformers have stated that the indigenous stalloy sheets suffer from lack of uniformity in thickness. Tatas should try to remove this defect and also continue their efforts to produce adequate quantities of sheets with a watt loss comparable to that of high grade imported sheets.
- (15) The industry should take note of the defects pointed out by consumers, particularly the leakage of oil from tanks and inferior workmanship, and endeavour to remove the defects, wherever they still exist. The manufacturers who do not have adequate arrangements for testing finished transformers and parts, should make such arrangements as early as possible.
- (16) The industry should continue its efforts to improve upon its delivery dates.

2. Government accept the recommendations generally and will take steps to implement them, as far as possible. As regards recommendation (2), in view of the administrative difficulties involved, to which a reference has been made by the Commission, the Government of India have accepted the alternative suggested. A notification is accordingly being issued increasing the rate of import duty leviable on transformer oil imported with protected categories of transformers to 27% *ad valorem*.

3. The attention of the industry is invited to recommendations Nos. (4) and (12) to (16).

L.K. JHA,

*Joint Secretary to the Government of India.*

(iv)

GOVERNMENT OF INDIA  
MINISTRY OF COMMERCE AND INDUSTRY

NOTIFICATION  
(Tariffs)

New Delhi, the 30th May, 1953.

No. 11(1)-T.B./51.- In exercise of the powers conferred by section 3A of the Indian Tariff Act, 1934 (XXXI of 1934), the Central Government hereby raises to 27% *ad valorem* the duty on transformer oil imported with power and distribution transformers up to 2,500 K.V.A. and 37.5 K.V. on the H.T. side (primary voltage being over 250) excluding furnace, rectifier and flame proof transformers, levied under item 72(3) of the First Schedule to the said Act, and any other law for the time being in force.

L.K. JHA,  
Joint Secretary to the Government of India.

A P P E N D I C E S

No.	Page
I. Government of India, Ministry of Commerce, Resolution, (Tariffs) No.1-T/A(52)/49 dated 23rd December, 1950.. . . . .	54
II. List of parties to whom questionnaires were issued and from whom replies were received.. . .	55
III. List of persons who attended the public inquiry on 30th June and 1st July, 1952.. . . . .	59
IV. Statement showing the estimated requirements of transformers for the major electric supply undertakings in India during the next three years. . . . .	61
V. Imports of transformer oil into India as reported by the Collectors of Customs.. . . . .	62
VI. Statement showing country-wise break-down of the total value of imports of transformers into India from 1937-38 to 1951-52. . . . .	63
VII. Statement showing the c.i.f. and total landed Cost of transformers for the year, 1952. . . . .	64





## REPORT ON THE POWER AND DISTRIBUTION TRANSFORMER INDUSTRY

1. The National Electrical Industries, Ltd., Bombay, in their letter dated 20th May, 1949 and subsequent letters addressed to the Government of India in the Reference to the Commission. then Ministry of Commerce, stated that the transformer industry in India suffered from a tariff inequality, inasmuch as the import duty on transformers was only 5½ per cent. *ad valorem*, whilst many of the materials and components required for the manufacture of transformers were dutiable at much higher rates. The firm requested that this tariff inequality be removed by abolition or reduction of the duties on the materials and components concerned. The Government of India in the Ministry of Commerce, after a preliminary consideration of this request, decided that the whole question of protection or assistance to the transformer industry needed examination and accordingly referred the case to the Tariff Board by their Resolution No.1-I/A(52)/49, dated 23rd December, 1950 (Appendix I). This reference was pending with the Board when it was succeeded by this Commission, and the Commission took it over under section 26 of the Tariff Commission Act, 1951. Under the Government Resolution referred to above, the inquiry was to include all types of transformers. Since, however, the manufacture of power and distribution transformers constitutes an industry by itself and since the original representation was in relation to this industry only, it was decided by the Commission, in consultation with the Development Wing of the Ministry of Commerce and Industry, to take up the case of power and distribution transformers first and to leave other types of transformers for separate examination later.

2. The present case falls under Section 11(i) (a) of the Tariff Commission Act (the grant of protection for the encouragement of any industry) and is governed by Section 14 of that Act [Principles to be taken into account in making any inquiry under Section 11(i) (a)]. Under the latter section, the Commission is to have, among other matters, due regard to:-

- Terms of reference.
- (a) the cost of production or manufacture in the principal growing, producing or manufacturing regions of India of the commodity produced by the industry claiming protection and the cost which should be taken to be representative of the industry concerned;
  - (b) the approximate cost of production or manufacture in the principal growing, producing or manufacturing centres of foreign countries of the commodity which competes with the commodity produced by the industry claiming protection, if the determination of such cost is necessary for the purpose of any case;
  - (c) the approximate cost of import of any such competing commodity as is specified in clause (b);
  - (d) the price which may be deemed to be the representative fair selling price for growers, producers or manufacturers in India in respect of the industry claiming protection;
  - (e) the quantities of the commodity required for consumption and the quantities thereof produced in, or imported into, India; and
  - (f) the effect of protection, if granted to an industry, on other industries, including cottage and other small-scale industries.

On the basis of its findings on the points referred to above, the Commission is to assess for the purpose of its Report:-

- (a) the relative advantages enjoyed by the industry;
- (b) the nature and extent of foreign competition;
- (c) the possibility of the industry developing sufficiently within a reasonable time to be able to carry on successfully, without protection;
- (d) the likely effect of a protective tariff or other form of protection on the interests of the consumer or of industries using the commodity in question, as the case may be; and

- (e) the desirability or otherwise of protecting the industry in the public interest.

Section 14 further provides that in recommending the grant of protection to any industry, the Commission may specify the conditions which shall be fulfilled before and after the grant of protection with particular reference to the following points, namely:-

- (a) the scale of output;
- (b) the quality of the products;
- (c) the price charged for the products;
- (d) the technological improvements required by the industry;
- (e) the need for research in the process of manufacture;
- (f) the training of officers, technicians and other persons employed in the industry;
- (g) the use in the industry of indigenous products, whether raw or manufactured;
- (h) the time within which an industry, in respect of which protection has been given in advance of production, should start production; and
- (i) any other matter in respect of which the Commission considers it necessary to specify conditions.

3. (a) The Tariff Board issued a press communique' on 6th June, 1951, inviting firms, associations or persons interested in the production or use of transformers Method of inquiry. and desiring to express their views on the question of protection or assistance to this industry to obtain copies of the relevant questionnaires from the Board's office and send replies thereto. On the same date, a questionnaire was sent to the known manufacturers of transformers and the Indian Electrical Manufacturers' Association, Calcutta. The Engineering Association of India, Calcutta, and the All-India Manufacturers' Organisation, Bombay, were addressed for information on various aspects of the industry. The Industrial Adviser (Engineering) to the Ministry of Commerce and Industry, the Directors of Industries with the Governments of West Bengal, Bombay, Mysore and Madras and

the Chambers of Commerce and Trade Associations were requested to furnish the Board with memoranda on this industry.

(b) In April, 1952, it was decided to take up first the case of power and distribution transformers only and a press note to this effect was issued on 23rd April, 1952. A questionnaire was issued to all the known importers on 16th April, 1952. Data relating to the c.i.f. prices and the statistics of imports of power and distribution transformers were sought from the Collectors of Customs. The manufacturers of the principal raw materials required for the production of transformers were requested to furnish information regarding their rated capacity and actual production and their views on the desirability or otherwise of reducing the import duties on the materials with which they were concerned. A list of firms, associations and persons to whom questionnaires were issued and from whom replies were received is given in Appendix II.

(c) Shri B.N. Adarkar, Member, Tariff Commission, visited the Government Electric Factory, Bangalore, on 23rd June, 1952. Dr. B.V. Narayanaswamy Naidu, Shri B.N. Adarkar, Members and Dr. D.K. Malhotra, Secretary, visited the factory of the National Electrical Industries, Ltd., Bombay, on 27th June, 1952.

(d) The Central Water and Power Commission collected data regarding the requirements of the various electricity supply undertakings for power and distribution transformers and furnished the Commission with a comprehensive memorandum on this and certain other aspects of the inquiry.

(e) Shri S.V. Rajan, Assistant Cost Accounts Officer, examined the cost of production of transformers at the National Electric Industries, Ltd., Bombay, and the Government Electric Factory, Bangalore. Shri N. Krishnan, Cost Accounts Officer, examined the cost of production of silicon steel laminations at the factory of the Sankey Electrical Stampings, Ltd., Bhandup, Bombay, and Shri V.S.S. Rajan, Cost Accountant, examined the cost of production of copper wires produced

by the Indian Cable Co., Ltd., and the National Insulated Cable Co., Ltd., both of Calcutta. A public inquiry into the power and distribution transformer industry was held at the Commission's office in Bombay on 30th June and 1st July, 1952. A list of persons who attended the inquiry and gave evidence is given in Appendix III.

4. The scope of the present inquiry is limited to power and distribution transformers. Radio and lighting Scope of the transformers and instrument transformers would inquiry. be covered in a separate inquiry. It was agreed at the public inquiry that any scheme of protection adopted for the transformer industry should not include furnace, rectifier or flame-proof transformers which were not made in the country. As regards voltages of power and distribution transformers to be included in the scope of the inquiry, the present range of production extends to 33 KV on the H.T. side. Transformers of 37.5 KV, however, are used in the Uttar Pradesh and we are advised that the manufacture of 37.5 KV transformers is not in any way more difficult than that of 33 KV transformers. It was also suggested at the public inquiry that any voltage limitation should be inclusive of the tapping allowance (which is usually 5 per cent.). As regards the output capacity, transformers up to 2,000 KVA are being produced by one of the units and we understand that transformers up to 2,500 KVA can be produced in any unit subject only to the availability of facilities for handling such large transformers. We have not been able to ascertain the extent of facilities available at each unit in the industry, and we recommend that a technical investigation be carried out by the Development Wing of the Ministry of Commerce and Industry, with a view to obtaining more accurate data about the highest ratings up to which transformers can be produced by each unit. On the basis of the evidence tendered at the public inquiry, however, we have decided to include power and distribution transformers up to 2,500 KVA and 37.5 KV (plus the usual tapping allowance) on the H.T. side within the scope of this inquiry.

5. The manufacture of transformers was started in India for the first time in 1936-37 by the Government History of Electric Factory, Bangalore. Prior to the the industry. Second World War, this was the only transformer factory in India and its production then averaged approximately 6,000 KVA per annum. During the war, the demand for transformers increased considerably, and three more units, namely, the Associated Electrical Industries Manufacturing Company Ltd., Calcutta, the Crompton Parkinson (Works) Ltd., Bombay and the Kaycee Industries, Ltd., Lahore, came into existence. The first of these started production in 1941 and the others in 1943. In 1947, as a result of Partition, the Kaycee Industries lost their factory in Pakistan, but they soon resumed their production of transformers in Bombay by acquiring the workshop of the Malik Electric Works. In May, 1949, this unit was taken over by the Radio Lamp Works, Ltd. Since 1947, the industry has expanded further through substantial additions to the capacity of the existing units, particularly Crompton Parkinson and the Government Electric Factory, and the establishment of three new units, namely, the National Electric Industries, Ltd., Bombay, the Electric Construction and Equipment Company, Ltd., Calcutta, and the Radio and Electricals, Ltd., Madras. The first two of these commenced production in 1949 and the last in 1950. The industry now consists of the seven units mentioned above. In addition, the Kirloskar Electric Company, Ltd., Bangalore, is going to have a transformer plant at an early date. The Company has arranged to get the necessary technical assistance from the Brush Electrical Engineering Company, Ltd.; for this project. We understand that the G.E.C. of India Ltd. also propose to take up the manufacture of transformers in the near future.

- 6.(a) A power or distribution transformer consists of:
- |              |   |
|--------------|---|
| Process of   | (i) a laminated silicon steel core,         |
| manufacture. | (ii) high voltage and low voltage windings, |

(iii) a tank (with cooling tubes) to which are fitted -

- (a) high voltage and low voltage insulating bushings, and
- (b) other fittings such as tapping switches, cable boxes, protective devices, oil conservators, silica gel breathers, etc.

(b) The core is built of laminations of high silicon low watt loss steel sheets about .014" thick. Standard sized sheets are cut into strips of requisite length and width on power operated guillotine shears and holes are punched on power presses. These laminations are coated with a special insulating varnish. They are then assembled by rigidly clamping them by means of bolts passing through insulating tubes to form vertical and horizontal limbs of the core. The horizontal limb is termed yoke. The laminations in the vertical limbs are of different widths and are so arranged that the cross-section approximates to a circle. Laminations in the central portion are also separated by means of strips of some insulating material which provide cooling ducts for oil circulation. The high voltage and low voltage coils are wound on special coil winding machines. The low voltage windings which have to carry large currents are wound on insulating cylinder with conductors consisting of one or more strands of insulated copper wires and the winding is of the spiral type. The low voltage winding is always placed next to the core. The high voltage coils are assembled on an insulating cylinder of larger diameter which is slipped over the low voltage coil. High voltage coils are wound in sections. This is done with a view to reducing the voltage difference between the layers of the windings in each section which in turn avoids the danger of insulation break-down. The various sections are separated from each other by means of spacers to allow free circulation of the oil. Before the coils are assembled on the limbs of the core, they are heated in a closed tank which is evacuated

to remove all air and moisture. Oil-proof insulating varnish is then introduced in the tank under pressure to ensure penetration of the varnish between the individual turns and layers of the coils. The coils are then baked and are ready for assembly.

(c) After the assembly of the low voltage and high voltage coils on the vertical limbs of the core, the top horizontal yoke is clamped in position. The completed unit which is the main part of the transformer is placed in a tank of suitable size. The tanks are fabricated from steel plates with welded joints. Steel cooling tubes are welded to the sides of the tank. They provide a greater cooling surface for heat dissipation and help the proper circulation of the oil in the tank. The tank is supported on rollers to facilitate transportation. A drain cock is also fixed at the bottom of the tank for removing the oil when necessary. The other important fittings are the high voltage and low voltage ceramic insulating bushings with terminals, cable boxes, tapping switches (for adjusting voltage changes), thermometers, oil level, Buchholtz protective relays, silica gel breathers, oil conserving tanks, etc. The construction of the top place and the method of fitting differs according as the transformer is required for outdoor or indoor installation. The oil conservator tank is fitted to minimise the contact of air with oil surface in the tank. The temperature of the transformer keeps on changing, depending on the load, with the result that the oil in the tank constantly changes its volume, which in turn causes expulsion and intake of air. A transformer thus "breathes" and this breathing takes place through silica gel which absorbs the moisture before air is let in.

7. Transformers are generally used for either stepping up or stepping down the voltage in an alternating current system. They form essential links between generation and distribution of electricity. To facilitate long distance transmission,

Uses of power and distribution transformers.



transformers are used at generating stations to step up the voltage. For a given power, the higher the voltage, the smaller is the current and consequently, the smaller are the losses due to the resistance of the cables. Thus, for a certain permissible loss, smaller cables can be employed, thereby effecting great economy in materials. At the consuming point, the high voltage has to be stepped down, with corresponding increase in the current, to suit the requirements of different classes of consumers, and for this again transformers are used.

8. (a) In 1947, the Electrical Machinery and Equipment Panel set up by the Government of India in the late Department of Industry and Supply, estimated the total domestic demand for transformers for the following five years at 300,000 KVA per annum. A very large proportion of this demand was expected to be in the range of 25 to 500 KVA and voltages up to 11 KV. This estimate was reviewed by the Development Committee for Electrical Machinery and Equipment Industries, which estimated the demand for power and distribution transformers up to 1000 KVA and 22 KV only, at 250,000 KVA per annum and accordingly recommended this as the short term production target to be achieved by 1952. An estimate made by the Central Water and Power Commission puts the total domestic requirements for transformers up to 2500 KVA and 22 KV on the H.T. side at 430,000 KVA for 1952, 550,000 KVA for 1953 and 630,000 KVA for 1954. The other estimates of domestic demand received by us ranged from 400,000 KVA to 2 to 2.5 million KVA. The British Electrical and Allied Manufacturers' Association (BEAMA) estimated India's probable annual requirements of transformers of all kinds during the next 10 years at 2 to 2.5 million KVA. This estimate was based on a ratio of 1 : 8 between new generating capacity and new transformer capacity. But apart from the fact that the Association has included in this estimate transformers above 2500 KVA and 33 KV, the ratio referred to above is also not supported by the available statistical data.

(b) The various estimates of demand received by us were discussed at the public inquiry. The total generating capacity in India was 1,713,237 KW in 1951. According to the draft Five Year Plan, the additional power from the projects included in the Plan will amount to 1,114,000 KW by 1955-56. In addition, the expansion in the major private electric supply systems is expected to be 200,000 KW during the next five years. The total increase in generating capacity will thus be 1,314,000 KW. A survey of the transformer installations and the generating capacity at two major power systems in the country, namely, the Tata Hydro Electrical System, and the Madras Government Electricity System which was carried out in 1949, showed that while the combined generating capacity of the two systems at the beginning of 1949 was 369,000 KW, the capacity of their power and distribution transformers was 515,172 KVA up to 11 KV and 112,141 KVA for 22 KV and 33 KV<sup>2</sup>. This gives a ratio of 1 : 1.97 between generating capacity and transformer capacity up to 33 KV. On the basis of this ratio, the transformer capacity up to 33 KV required to utilise additional power to the extent of 1,314,000 KW would be about 2,650,000 KVA. The representative of the Bombay Electric Grid stated at the public inquiry that for an additional generating capacity of 30,000 KW in that system, the estimated requirements of transformers of the type covered by the present inquiry were 58,000 KVA which indicated a ratio of 1 : 1.93. The ratio of 1 : 1.97 adopted above, therefore, appears reasonable. While the total demand for power and distribution transformers up to 33 KV which is likely to result from the projected expansion of power supply during the period of the Five Year Plan is estimated at 2,650,000 KVA, it is difficult to estimate what part of this demand is likely to be realised in each year or even during the five-year period taken as a whole. Even if it were assumed that the installation of the additional generating capacity will take place

\*See "Transformer Requirements in India", an article by N. Ramnohan of the Central Water and Power Commission, in "Power Engineer", January, 1952.

according to plan, allowance has to be made for the fact that there is usually a time-lag between the installation of generating capacity and that of transformer capacity, and it is difficult to estimate the probable time-lag during the next five years. Further, the above estimate does not include the demand for replacements and the additional transformer capacity required to utilise the existing generating capacity. Sufficient data are not available to frame a reliable estimate of the replacement needs, while the additional transformer capacity required for fuller utilisation of existing generating capacity is not expected to be large, since the generating capacity in most of the major power systems is already being utilised to the maximum extent. Some industrial undertakings generate their own power and may need additional transformer capacity. The demand for transformers on this account, however, is likely to be small, since it is expected that industries will in future be taking power from public and private utilities to an increasing extent.

(c) According to the draft Five Year Plan, the phasing of the power development schemes in the public sector during the period of the Plan is expected to be as follows:-

			Additional power (000 KW) (Cumulative)
1951-52	...	...	144
1952-53	...	...	273
1953-54	...	...	889
1954-55	...	...	1,000
1955-56	...	...	1,114

(d) The Central Water and Power Commission has, at our request, collected information about the probable requirements of the major electric supply undertakings in the country for transformers up to 2,500 KVA and 33 KV during the next 3 years. The total requirements of these undertakings are estimated at about 580,000 KVA for the entire period. A breakdown of this estimate is given in Appendix IV.

9. The pre-war capacity of the industry was only 6,000 KVA mostly confined to ratings up to 250 KVA and 11 KV Rated on the H.T. side. By 1946, the capacity had capacity. increased to 78,000 KVA per year, but the range of production had remained substantially the same as before. Since then there has been a further increase in the rated capacity which is now estimated at 370,000 KVA. The figures for the individual units are as follows:-

	KVA
The Crompton Parkinson (Works) Ltd. ... ..	120,000
The Associated Electrical Industries Manufacturing Company Ltd. ... ..	84,000
The National Electrical Industries Ltd. ... ..	60,000
The Government Electric Factory ... ..	40,000
The Radio and Electricals Ltd. ... ..	30,000
The Electric Construction and Equipment Company Ltd. ...	24,000
The Radio Lamp Works Ltd. ....	12,000
Total ... ..	<u>370,000</u>

Of the two new units, the Kirloskar Electric Company, Ltd. will have a capacity of 50,000 KVA, while the capacity of the General Electric Company of India, Ltd. is expected to be 15,000 KVA during the planning period. The Mysore Government have a scheme to expand the transformer section of the Government Electric Factory, as a result of which the capacity of the factory is expected to increase to 54,000 KVA in 1952-53 and to 80,000 KVA, when the scheme is completed. The Radio and Electricals, Ltd. also propose to make substantial additions to their capacity and an increase of at least 20,000 KVA may be expected. When these expansion projects are implemented, the capacity of the industry would be nearly 485,000 KVA per annum.

10. Production of transformers in India showed a progressive increase from 1949 to 1951. The seven units Domestic listed in the preceding paragraph produced production. three-phase transformers to the extent of 84,842 KVA in 1949, 153,181 KVA in 1950 and 183,161 KVA

in 1951. The number of three-phase transformers produced amounted to 982 in 1949, 1,277 in 1950 and 1,926 in 1951. During the first four months of 1952, the industry produced 749 three-phase transformers with a total capacity of 65,036 KVA. Six of the units produced single phase transformers to the extent of 12,951 KVA in 1949, 21,683 KVA in 1950, 28,132 KVA in 1951 and 5,547 KVA in the first four months of 1952. The total number of single phase transformers produced was 1,309 in 1949, 1,800 in 1950, 1,990 in 1951 and 401 in the first four months of 1952. As stated in the preceding paragraph, the annual rated capacity of the industry is estimated at 370,000 KVA, of which about 57 per cent. is at present utilised. This has been explained by the industry as due to lack of orders. The Government Electric Factory, Bangalore, is the only unit which is now working to its full capacity. The industry has been endeavouring to widen its range of output and is now producing transformers up to 2,000 KVA and 11 KV on the H.T. side. Transformers of smaller output capacity, but voltages up to 33 KV on the H.T. side are also being produced. The bulk of the production consists of ratings up to 1,000 KVA and 11 KV on the H.T. side. A detailed classification of the three-phase and single phase transformers produced in India since 1949 is given in the following two statements. (Vide Statements I & II)

(Statements on pages 14 & 15)

The Crompton Parkinson (Works) Ltd., and the National Electrical Industries, Ltd. have extended their manufacturing range to 2,500 KVA and 33 KV on the H.T. side. At the time of the public inquiry, Crompton Parkinsons were engaged in producing transformers of 2,000 KVA and the National Electrical Industries had orders for transformers of 500 and 1,000 KVA and 33 KV on the H.T. side. The Government

## STATEMENT I

	1943		1950		1951		1952 (January-April)	
	No.	KVA	No.	KVA	No.	KVA	No.	KVA
Upto 3.3 KV:								
Upto 25 KVA	68	1183	145	1916	198	2860	57	668
Above 25 to 75 KVA	33	1723	55	2910	28	1465	15	830
" 75 to 250 "	61	10325	61	9575	55	8250	15	2525
" 250 to 500 "	7	2800	7	2900	32	10925	2	700
" 500 to 1000 "	-	-	-	-	-	-	3	2750
	169	15831	268	17301	313	23300	92	7463
Above 3.3 to 6.6 KV:								
Upto 25 KVA	18	276	9	120	85	1231	27	1135
Above 25 to 75 KVA	14	850	9	490	23	1310	28	1825
" 75 to 250 "	69	11095	104	21850	74	13700	42	6725
" 250 to 500 "	16	7300	42	18500	55	25400	27	10400
" 500 to 1000 "	2	1750	3	2500	14	10650	-	-
" 1000 to 1500 "	-	-	-	-	1	1500	-	-
	117	21271	167	43460	252	53791	124	20085
Above 6.6 to 11 KV:								
Upto 25 KVA	183	2990	178	2990	480	8025	310	4532
Above 25 to 75 KVA	246	15700	299	18570	603	29622	117	5580
" 75 to 250 "	139	9700	252	36875	173	24375	55	7625
" 250 to 500 "	18	7800	48	20650	43	17050	18	6200
" 500 to 1000 "	2	2000	8	6950	14	10850	9	7501
" 1000 to 1500 "	-	-	-	-	4	5750	3	3750
	568	38190	793	86035	1317	95473	510	35188
Total upto 11 KV:	874	75292	1228	146796	1882	172564	728	82736
22 KV:								
Upto 25 KVA	7	175	10	250	-	-	-	-
Above 25 to 75 KVA	76	4725	20	1185	10	500	11	800
" 75 to 250 "	22	2650	15	1700	20	2350	11	1200
" 250 to 500 "	2	1000	1	500	7	2900	1	300
" 500 to 1000 "	1	1000	3	2750	4	3100	-	-
" 1000 to 1500 "	-	-	-	-	1	1250	-	-
	108	9550	49	6385	42	10100	23	2300
33 KV:								
Above 75 to 250 KVA	-	-	-	-	2	500	-	-
Grand Total:	982	84842	1277	153181	1926	183164	749	85038

## STATEMENT II

Number of single phase transformers together with the total KVA produced in India during 1949, 1950, 1951 and January to April, 1952.

	1949		1950		1951		1952	
	Nos.	KVA	Nos.	KVA	Nos.	KVA	Nos.	KVA
<b>Upto 3.3 KV:</b>								
Upto 25 KVA	167	1020	83	420	97	687	28	237
Above 25 to 75 KVA	4	217	-	-	19	822	1	75
" 75 to 250 "	-	-	9	800	3	400	4	353
Total:	171	1238	92	1320	119	1909	33	765
<b>Above 3.3 to 6.6 KV:</b>								
Upto 25 KVA	725	5700	1125	9371	1130	7613	235	2163
Above 25 to 75 KVA	225	3022	112	5487	68	3387	14	700
" 75 to 250 "	-	-	17	2350	23	4650	-	-
" 250 to 500 "	1	300	-	-	-	-	-	-
Total:	951	9022	1254	17208	1221	15650	249	2863
<b>Above 6.6 to 11 KV:</b>								
Upto 25 KVA	175	1843	426	3600	590	4653	118	919
Above 25 to 75 KVA	8	273	18	925	36	1570	-	-
" 75 to 250 "	4	575	9	1600	19	2900	-	-
" 250 to 500 "	-	-	-	-	4	1200	-	-
Total:	187	2691	453	6125	649	10323	118	919
<b>Total upto 11 KV:</b>	<b>1309</b>	<b>12951</b>	<b>1799</b>	<b>24653</b>	<b>1989</b>	<b>27882</b>	<b>400</b>	<b>4547</b>
<b>22 KV:</b>								
Above 25 to 75 KVA	-	-	1	30	-	-	-	-
" 1000 KVA	-	-	-	-	-	-	1	1000
<b>33 KV:</b>								
Above 250 KVA	-	-	-	-	1	250	-	-
<b>Grand Total:</b>	<b>1309</b>	<b>12951</b>	<b>1800</b>	<b>24683</b>	<b>1990</b>	<b>28132</b>	<b>401</b>	<b>5547</b>

Electric Factory has also produced a few transformers of 33 KV, but with a capacity of 250 KVA only. The Kirloskar Electric Company propose to confine their production during the first year to transformers from 50 to 500 KVA. The General Electric Company will produce transformers of 250 KVA or less to start with, but will gradually widen their range to 2,500 KVA and 11 KV.

11. (a) The following is a list of the principal raw materials required for the manufacture of transformers:-

Raw materials. (i) High silicon, low watt-loss steel sheets, generally known as Stalloy, special Stalloy and extra special Stalloy.

(ii) Cables and wires:

- (a) Insulated copper wires and strips,
- (b) Cables and flexibles,
- (c) Electrolytic bare copper wires, strips, bars, rods, etc.

(iii) Iron and Steel:

- (a) M.S. plates, rods, bars and sections,
- (b) Wrought iron pipes and tubes,
- (c) Castings.

(iv) Non-ferrous metal castings, rods, tubes, etc.

(v) Insulating materials:

- (a) Synthetic resin bonded paper sheets, boards, and tubes (known by various trade names such as Bakelite, Dilecto, etc.),
- (b) Varnished cambric cloth, tapes and sleeveings,
- (c) Vulcanised fibre sheets and boards, known as leatheroid, elephantide, etc.,
- (d) Insulating papers.

(vi) M.S. bolts, nuts, screws and washers.

(vii) Paints and varnish.

(viii) Langite or bonded cork sheets.

(ix) Transformer oil.

(x) Special components:

Cable boxes, terminal components, off load tapping switches, silica gel breathers, dial thermometers, Buchholtz relays, oil level gauges, etc.



Of the above materials, silicon steel sheets of various grades having watt loss of not less than 0.53 W/lbs. are produced by the Tata Iron & Steel Co., Ltd., and are made into laminations, to the specifications required by the transformer industry, by Messrs. Sankey Electrical Stampings Ltd. Silicon Steel sheets having watt loss of 0.49 W/lbs. are imported. Cotton covered and bare copper wires are produced by the Indian Cable Co., and the National Insulated Cable Co. Most of the mild steel and brass materials required for the manufacture of transformers are available locally. Most of the insulating materials, cork sheets, transformer oil and miscellaneous components are imported. Some of the paints and varnishes used by the industry are produced in India.

(b) The following table shows the proportions of imported and locally purchased materials to the total ex-works costs of production of five types of transformers produced by a representative unit:-

	<u>25 KVA</u> per cent.	<u>50 KVA</u> per cent.	<u>100 KVA</u> per cent.	<u>250 KVA</u> per cent.	<u>500 KVA</u> per cent.
(1) Imported materials	38.47	39.93	38.99	38.18	47.41
(2) Locally purchased materials.	26.02	27.18	24.15	31.18	27.17
(3) Total of (1)&(2)	62.49	67.11	63.14	69.34	74.58
(4) Total ex-works costs of production.	100.00	100.00	100.00	100.00	100.00

The expression 'imported materials' in the above table includes materials which are predominantly imported, and the total consumption of such materials has been taken into account in calculating the above percentages, even though a small part of the consumption may have been met from domestic sources. It will be seen that the cost of materials constitutes 62 to 75 per cent. of the total cost of production of transformers. A reduction in the cost of materials, therefore, can make a material difference in the final cost. The industry has urged that the rates at which it has to purchase its materials, whether indigenous or imported,

are higher than those paid by its foreign competitors, and we have, therefore, to examine the position regarding the supply and prices of the principal materials. Such examination is also necessary in order to decide whether the abolition or reduction of duty requested by the industry in the case of certain materials is justified.

(c) *Silicon steel sheets (Stalloy sheets):*

(i) The transformer industry requires steel sheets with approximately 4 per cent. silicon and in 0.014" thickness. The total requirements of the industry on the basis of its present programme of manufacture are estimated at 1,520 tons in terms of sheets and 1,140 tons in terms of laminations. When the Kirloskar Electric Company and the G.E.C. start the manufacture of transformers, additional 220 tons of sheets, or 165 tons of laminations, will be required. The consumption of transformer grade sheets during 1951, however, was much smaller, being estimated at 750 tons in terms of sheets, equivalent to about 565 tons in terms of laminations.

(ii) The Tata Iron & Steel Co. took up the production of transformer grade silicon steel sheets about five years ago. Their rated capacity was estimated at 780 tons in 1949, but owing to improved practice, the capacity has now increased to 1,200 tons. This estimate of capacity is liable to vary, because, firstly, silicon steel sheets are produced on the same equipment as is employed for rolling mild steel sheets and, secondly, since the production of silicon steel sheets has to be carried out under a pre-determined set of controlled conditions of the mill and furnaces, better results can be obtained by continuous practice. Tata's annual production of transformer grade sheets since 1949 was as follows:-

1949	...	...	...	374 tons
1950	...	...	...	132 "
1951	...	...	...	828 "
1952 (January-May)	...	...	...	400 "

Tatas sell their entire production of transformer grade sheets through the Sankey Electric Stampings Ltd. This

arrangement has the advantage of providing Tatas with an assured outlet for their entire production. Tata's technique of manufacturing silicon sheets has not yet advanced sufficiently to enable them to produce different grades of such sheets in settled proportions. Sankeys, however, take over the entire quantity of sheets produced by Tatas and are able to make use of even lower grade sheets, because of the fact that they produce stampings for a variety of electrical industries some of which can use such sheets to a certain extent. Except the Associated Electrical Industries Manufacturing Co., all other transformer manufacturers purchase laminations from Sankeys, who have the necessary equipment for flash enamelling. Sankey's rated capacity is estimated at 1,800 tons of laminations per annum on double shift basis. Thus, Sankeys have enough capacity to meet the entire requirements of the domestic transformer industry for laminations. Their actual production of laminations since 1949 was as follows:-

1949	...	...	...	407 tons
1950	...	...	...	349 "
1951	...	...	...	366 "
1952 (January-May) ..	...	...	...	186 "

The representative of Sankeys stated at the public inquiry that latterly transformer manufacturers in India have been demanding extra special stalloy laminations to a much larger extent than before. Tatas' production of extra special stalloy sheets is limited, while their production of stalloy grade sheets is adequate to meet the requirements of the industry. In this connection, Tatas have suggested that the Indian Standards Institution should examine the desirability of relaxing for a short period the specifications of power and distribution transformers, so as to enable the manufacturers in India to utilise the domestic capacity for different grades of stalloy sheets to the maximum extent. We are unable to support this suggestion. Since February 1952, Tatas have been able to produce about 30 tons of extra special stalloy sheets per month, and this is a little over 30 per cent. of their total production of

transformer grade sheets. With some further effort, Tatas should be able to increase this proportion. In any case, a relaxation of specifications will be a retrograde step, until it is established that an increase in the production of extra special stalloy sheets to the requisite extent is impracticable in the near future. We, however, recognize that this developing industry should be protected against any difficulties likely to arise from excessive imports. The laminations industry also has enough capacity to meet the requirements of the transformer industry. At present only 27 to 30 per cent. of this capacity is being utilized. A fuller utilization of the capacity of the laminations industry would be beneficial to the transformer industry also, since it would result in lowering the cost of production of laminations. We recommend, therefore, that imports of both transformer grade sheets and laminations should be so regulated as to promote a fuller utilization of the domestic capacity for the production of these materials.

(iii) Silicon steel laminations account for 11 to 19 per cent. of the total ex-works cost of a transformer, depending on the type of transformer. In view of the importance of this material and the fact that its production is in the hands of a single unit in the country, we considered it necessary to examine the position regarding its prices. Tatas have informed us that their selling prices for silicon steel sheets of grades and gauges used for the manufacture of power and distribution transformers are as under:-

Quality	Nominal silic- con contents	Watt loss at B. max 10,000 Thickness		Selling prices f.o. Calcutta and Bombay Rupees per ton
	%	lines/Sq. cm.		
Stalloy	4.0	.63 w/lb.	.014"	1192
Special stalloy	4.0	.59 w/lb.	.014"	1208
Extra special stalloy	4.0	.53 w/lb.	.014"	1241

The above prices are higher than those quoted by Tatas last year. For example, the price for stalloy 0.014" was Rs. 942 per ton in 1951 as compared with Rs. 1,192 quoted above - an increase of 26.5 per cent. Tatas have explained this increase as due to the increase in their costs of production. The selling prices given above are inclusive of railway freight, commission payable to the selling agents and certain miscellaneous items of expenditure. After allowing for these expenses and on the basis of an estimate of current cost of production furnished by Tatas, the above prices seem reasonable. Owing to certain practical difficulties, it has not been possible for us to arrange for a detailed investigation of Tatas' cost of production. We have also not considered it essential to do so on the present occasion, because, firstly the prices charged by Tatas for this material, which constitutes a small part of their total production, most of which is sold at controlled prices, must be viewed against the general background of the economics of steel production, and secondly, despite the recent increase, Tatas' prices are comparable with those at which this material is available to transformer manufacturers in the United Kingdom. We understand that the current landed cost of extra special stalloy sheets is Rs. 1,538 per ton for imports from the United Kingdom and Rs. 1,700 per ton for imports from the United States, as compared with Rs. 1,241 per ton charged by Tatas for the same grade. The quotation for British sheets includes an export premium, the price charged to users in the United Kingdom being Rs. 1,200 per ton. Thus, Tatas are selling their transformer grade sheets at about the same price at which they are available to manufacturers in the United Kingdom.

(iv) The selling prices charged by Sankeys for laminations are as follows:-

				Price per lb.		
				Rs. a. p.		
Stalloy .014	...	...	...	1	0	0
Special Stalloy .014	...	...	...	1	0	6
Extra Special Stalloy .014	...	...	...	1	1	0

The Cost Accounts Officer attached to the Commission has examined the cost of production of transformer laminations at Sankeys' factory in Bombay. The examination showed that, on the basis that 4 tons of stalloy sheets are required to produce 3 tons of laminations and allowing for depreciation at income tax rates, interest on working capital at 1 per cent. of the cost of production and return on block at 10 per cent. of the gross block, the fair ex-works cost of transformer laminations made from Tatas' stalloy grade sheets for an assumed production of 400 tons worked out to Rs. 2,100 per ton for the following six sizes:

- (1) 134 mm x 820 mm x 1 7/64" slot
- (2) 155 mm x 772 mm x 1 7/64" "
- (3) 110 mm x 772 mm x 1 7/64" "
- (4) 82.5 mm x 772 mm x 1 7/64" "
- (5) 48.5 mm x 772 mm x 1 7/64" "
- (6) 46.5 cm x 11.5 cm x 1 cm "

The price quoted by Sankeys for laminations of these sizes, however, is Rs. 2,240 per ton. The difference is partly explained by the fact that Sankeys have to use imported sheets (which are more expensive than Tatas' sheets) for a part of their production of transformer laminations, since out of the supplies received from Tatas, Sankeys are required to sell 15 tons of sheets as sheets every month. In 1950, Sankeys made a loss and their profits in 1951 were not excessive. Their Calcutta factory is running far below capacity and the overall cost of production will show some reduction when that factory goes into full production. Taking all these factors into consideration, we are satisfied that the prices charged by Sankeys for transformer laminations are reasonable. We recommend, however, that Sankeys should try to reduce the percentage of wastage in

the manufacture of transformer laminations, with a view to lowering their costs.

(v) As regards the quality of silicon steel sheets produced in India, some of the transformer manufacturers have complained of lack of uniformity in thickness which affects the performance of transformers. We recommend that Tatas should try to remove this defect and also continue their efforts to produce adequate quantities of sheets with a watt loss comparable to that of high grade imported sheets.

(vi) The import duty on silicon steel sheets is Rs. 47-1-5 per ton, standard, and 12½ per cent. *ad valorem*, or Rs. 47-1-5 per ton, whichever is lower preferential, and that on silicon steel strips is 25 1/5 per cent. *ad valorem*, standard, and 12 3/5 per cent. *ad valorem*, preferential. Since it is desirable to encourage the production of these materials in the country, we do not recommend a reduction in these duties.

(d) *Copper wires and strips:*

(i) The total annual requirements of the existing transformer factories for copper wires and strips, on the basis of their present programme of production, were estimated at the public inquiry at 663 tons. These will increase to about 800 tons, when the transformer sections of the Kirloskar Electric Works and the General Electric Company come into production.

(ii) Paper covered wires are generally considered more suitable than cotton covered wires for the manufacture of power and distribution transformers and are also cheaper. For voltages above 11 KV, paper covered wires are indispensable. However, owing to the difficulty of obtaining paper covered wires from abroad and the fact that cotton covered wires are available locally, the Indian transformer industry has been using cotton covered wires for a part of its requirements.

(iii) The Indian Cable Co., Ltd., and the National Insulated Cable Co., Ltd., have been supplying cotton covered wires to the transformer industry. The former Company also produces cotton covered strips and paper covered wires and strips. The National Insulated Cable Co., does not produce strips, but is planning to take up production of paper covered wires at an early date.

(iv) The Indian Cable Co., Ltd., has furnished the following information regarding its capacity and production since 1949:-

	Capacity (triple shift)	Production (in tons)			
		1949	1950	1951	1952 (January to May)
Cotton covered circular wires	350	249	148	219	147
Cotton covered strips	250	67	48	31	26
Paper covered circular wires	79	-	-	-	-
Paper covered strips	250	-	-	3	4
A combination of paper covered and cotton covered strips.	-	-	-	1	1

The rated capacity of the National Insulated Cable Company for the production of double or single cotton covered wires (on three shift basis) is 200 tons per annum and its actual production of these wires since 1949-50 was as follows:-

			Tons
1949-50	...	...	19
1950-51	...	...	51
1951-52	...	...	48
1952-53 for April and May, 1952.	...	...	18.7

Copper wires are required by other industries, such as electric fans and motors, besides transformers. Consequently, the present production of these wires in the country falls short of the domestic demand. We understand that the



shortage of electrolytic copper has been the principal difficulty in the way of increasing the domestic production of copper wires.

(v) The cost of copper wires and strips varies from 16 to 29 per cent. of the total cost of production of different types of transformers. The prices of copper wires and strips have, therefore, a material bearing on the cost of production of transformers. During the course of this inquiry, several transformer manufacturers complained to us of the high prices charged for double cotton covered wires by both the Indian Cable Co. and the National Insulated Cable Co. The representatives of both the Companies stated that the high prices of indigenous double cotton covered wires were due to the high cost of cotton yarn as well as the scarcity and high prices of electrolytic copper. Since copper wires are an essential material for several electrical engineering industries, we considered it necessary to depute our Cost Accountant to examine the cost data of both these Companies, with a view to determining their actual costs of production. A detailed report\* on this cost investigation is being forwarded to Government as a separate confidential enclosure to this Report. The following statement gives a comparison of the fair ex-works prices of different specifications of double cotton covered and double paper covered copper wires and strips, as determined by us, for 1951-52 and 1952-53, with the selling prices actually charged by the two producers:

(Statement on page 26)

We understand that the two Companies allow a commission of 10 per cent. on the list price to dealers. Since the Companies sell their products at a uniform price at all the ports, allowance should also be made for the overall freight disadvantage, which is estimated at 6 pies per lb. in the case of both the Companies. Even after these adjustments, the prices charged by the Companies show a substantial

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Items	Gauge	1951/52			1952/53		
		Fair ex-	Selling Margin		Fair ex-	Selling Margin	
		works price	price	%	works price	price	%
		Rs. a. p.	Rs. a. p.		Rs. a. p.	Rs. a. p.	
<b>A. ICCO</b>							
D.C.C. Wires	0.034"	3 0 6	5 5 0	78	3 8 6	5 16 9	69
"	0.072"	2 4 11	4 3 3	82	2 13 1	4 12 9	70
"	0.128"	2 2 2	3 4 3	53	2 11 9	3 11 6	36
D.P.C. Wires	0.068"	3 9 7	5 5 0	48	3 8 5	5 5 0	51
"	0.108"	3 2 10	4 13 0	51	3 3 10	4 13 0	49
D.C.C. strips	0.200"						
	x	3 1 1	4 3 3	37	3 9 3	4 3 3	17
	0.100"						
"	0.375"						
	x	2 10 4	4 1 3	54	3 5 1	4 1 3	23
	0.140"						
D.P.C. strips	0.400"						
	x	2 10 7	3 14 0	46	2 15 9	3 14 0	30
	0.110"						
"	0.140"						
	x	3 1 10	3 15 0	26	3 3 1	3 15 0	23
	0.080"						
Plain Copper strips	0.200"						
	x	2 10 6	3 7 0	29	3 5 3	3 7 0	3
	0.360"						
"	1/2"						
	x	2 8 8	3 7 0	35	3 3 9	3 7 0	8
	5/16"						
<b>B. NICCO</b>							
D.C.C. Wires	0.072"	2 8 7	4 3 3	88	3 0 8	4 12 9	58
"	0.048"	2 13 10	4 12 8	67	3 5 4	5 7 9	65
"	0.020"	4 2 2	8 4 3	100	4 14 1	9 2 6	88

margin over their fair ex-works costs of production, as may be seen from the following comparison for DCC wires of .072 gauge:

	ICCO Rs. a. p.	NICCO Rs. a. p.
(A) List price for the trade per lb.	4 12 9	4 12 9
Less Commission at 10%	0 7 8	0 7 8
Net selling price	<u>4 5 1</u>	<u>4 5 1</u>
(B) Fair ex-works price	2 13 1	3 0 8
Add overall freight disadvantage	0 0 6	0 0 6
Fair selling price	<u>2 13 7</u>	<u>3 1 2</u>
Net margin over fair selling price	<u>1 7 6</u>	<u>1 3 11</u>
Margin over fair selling price	52%	41%

It will be seen that both the Companies are charging excessive margins over their fair ex-works costs. The conclusion is further corroborated by the financial accounts of these Companies. The profits earned by the Indian Cable Co., after providing for depreciation at income tax rates but not for the Director's commission and taxation, amounted to Rs. 47.73 lakhs in 1950-51, which worked out to 91.65 per cent. on the gross block (as compared with a return of 10 per cent. on the gross block included in the above estimates of fair ex-works prices). During 1950-51, the Company issued free bonus shares to the total value of Rs. 55.75 lakhs. The issue of bonus shares was nearly double the amount of the total paid-up capital of the Company. In the same year, the National Insulated Cable Company earned a profit of Rs. 19.317 lakhs, after providing for depreciation at income tax rates, but not for the Managing Agency Commission and taxation. This worked out to 39.02 per cent. on the gross block. The accounts of both the Companies for 1949-50 also disclose a similar position. The Indian Cable Co. made a profit of Rs. 40.32 lakhs on a gross block of Rs. 49.83 lakhs and the National Insulated Cable Co., a profit of Rs. 12.20 lakhs on a gross block of Rs. 48.39 lakhs. The accounts for 1951-52 are yet to be published and hence the corresponding figures

for that year are still confidential. The Companies have been able to earn such high profits because of the rise in the prices of imported copper wires and strips. Imports of electrolytic copper wire bars are allowed free of duty, but it is clear from the above data that the users of DDC and DPC wires are not receiving the benefit of this concession. We are satisfied that the prices charged by the Indian Cable Company for DCC and DPC wires and strips, and those charged by the National Insulated Cable Co. for DCC wires are excessive, and recommend that these two Companies should be asked to reduce their prices so as to bring them in fair relation to their costs. It is not desirable that these Companies should be free to make large profits on a material of general use in electrical engineering industries which is likely to be required in increasing quantities by Government and public utility undertakings. Government should, therefore, keep a watch over the prices of indigenous DCC and DPC copper wires and strips, with a view to ensuring that they are maintained at a reasonable level.

(vi) DCC or DPC copper wires of sectional area of less than  $\frac{1}{80}$ th part of a square inch are assessed to duty at  $37\frac{1}{2}$  per cent. *ad valorem* standard, and 25 per cent. *ad valorem* preferential. Other DCC or DPC copper wires are assessed at  $37\frac{4}{5}$  per cent. *ad valorem* standard and  $25\frac{1}{5}$  per cent. *ad valorem* preferential. The transformer industry has asked for reduction or abolition of these duties. Since bare hard drawn or annealed electrolytic copper wires and cables are subject to a protective duty of  $31\frac{1}{2}$  per cent. *ad valorem*, we do not consider it advisable to reduce the duties on DCC or DPC wires below their present levels. The Indian Cable Company has suggested that in order to reduce the cost of production of copper wires, the import duty on insulating paper and cotton yarn should be reduced. Cotton yarn is already exempt from duty, but insulating paper is subject to duty at  $39\frac{3}{8}$  per cent. The incidence of this duty on the cost

of production of DPC wires, however, is negligible, amounting to only 4 to 6 pies per lb. of DPC wire. The Indian Cable Company's selling prices for DPC wires vary from Rs. 4-13-0 to Rs. 5-5-0 per lb. respectively. We do not, therefore, recommend any reduction in the duty on insulating paper.

(e) *Cooling tubes:*

(i) Cooling tubes used in the manufacture of transformers are mostly seam-welded tubes of  $1\frac{1}{2}$ " outside diameter x 16 gauge or 2" outside diameter x 14 gauge. The annual requirements of the existing units for implementing their present programme of production are estimated at 552,000 ft., equal to about 247 tons. The two new units, Kirloskar Electric Co., and G.E.C., are expected to require additional 55,000 ft. or 24 tons per annum, when they come into production. The industry has hitherto been obtaining most of its requirements of cooling tubes from abroad. Seam-welded tubes, however, are produced by the Premier Automobiles, Bombay, and some of the transformer units have been using tubes produced by this firm. We understand that the Premier Automobiles have an annual rated capacity, on a single shift basis, of 1,000 tons, if the tubes are to be made from sheets and 3,000 tons, if strips are available. Their Tube Mill was started on an experimental basis in the middle of 1949 and regular working commenced from April, 1950. Production since April, 1950 was as follows:-

1950 (April-December)	...	112 tons
1951	...	243 "
1952 (January-May)	...	131 "

The above figures include a wide range of sizes, from  $\frac{5}{8}$ " to 3" outside diameter and from 0.030" to 0.135" thickness. Besides the transformer industry, the automobile, furniture and cycle industries also use seam-welded tubes. Since the total requirements of the transformer industry are not more than 275 tons, while the annual rated capacity of the Premier Automobiles alone is 3,000 tons (from strips),

it is clear that there is enough domestic capacity for this material to make the transformer industry independent of imports in course of time.

(ii) The actual production of tubes is far below capacity, mainly because of the shortage of strips. Hot rolled or cold rolled strips are not available at present in adequate quantities or at reasonable rates. The Premier Automobiles have consequently had to take sheets produced by Tatas or Scob, cut them into strips and then butt-weld them into tubes. This increases the cost of manufacture and also slows down production. As stated earlier, the firm's capacity for the manufacture of tubes from sheets is only one-third of what it would be, if strips were available.

(iii) The cost of cooling tubes comes to 0.66 to 3.8 per cent. of the ex-works cost of different sizes of transformers. For the reasons given above, the cost of production of tubes in India is high. Consequently, the Premier Automobiles' selling prices for 1½" OD x 16 G tubes and 2" OD x 14 G tubes are 14 annas 6 pies and Rs. 1-6-0 per foot, as compared with the average landed cost of 9 annas 3 pies for imported tubes. The quality of indigenous tubes is also not entirely satisfactory. Sometimes the joint gives way when the tube is bent. This defect is partly due to the fact that the tubes are made from sheets instead of strips.

(iv) The import duty on cooling tubes is 19 17/32 per cent. *ad valorem*. The transformer industry has asked for abolition or reduction of this duty. While it is recognised that owing to the non-availability of strips, the transformer industry will have to import a part of its requirements of tubes for some time, we are unable to recommend a reduction in the duty, in view of its possible adverse effects on domestic production of tubes. The cost of production of tubes in India will be substantially reduced, when adequate supplies of strips become

available. The Premier Automobiles have suggested a reduction in the duty on strips, which is at present levied at 25  $\frac{1}{5}$  per cent. *ad valorem* standard and 12  $\frac{3}{5}$  per cent. *ad valorem* preferential. Since tubes are used in many other industries (such as automobiles, furniture, etc.) and we have no data about the capacity of these industries to bear the burden, we do not wish to make any recommendation on this point.

(f) *Bushings:*

(i) On the basis of the number of transformers produced in 1951 and taking 7 bushings for each three phase transformer and on an average, 2 for each single phase transformer the number of bushings consumed by the transformer industry during 1951 comes to 17,460. The demand for bushings in the near future is likely to be much higher. In most cases, four-sevenths of the total number of bushings used are low tension bushings, but since some transformers are fitted with high tension bushings on both sides, the total requirements may be taken as equally divided between high tension and low tension bushings. There are four factories in India - the Government Porcelain Factory, Bangalore, the Bengal Potteries, Calcutta, the Bombay Potteries & Tiles Ltd., Bombay and the Government Porcelain Factory, Kundara (Travancore-Cochin) - which manufacture bushings. The transformer industry purchases most of its requirements of L.T. bushings from these factories. H.T. bushings are mostly imported. The Government Porcelain Factory and the Bengal Potteries claim to have capacity for manufacturing H.T. bushings also. The entire production of the Government Porcelain Factory, however, is sold to the Government Electric Factory, Bangalore.

(ii) At the public inquiry, the transformer manufacturers expressed considerable dissatisfaction about the quality of indigenous bushings. It was pointed out that the porcelain factories were not taking sufficient interest in improving the quality of their bushings. In the case

of both L.T. and H.T. bushings, it was important that porosity should be kept within close tolerances and that the specifications regarding physical dimensions should be strictly adhered to. Indigenous bushings were defective in both these respects and possessed other defects also, such as poor glazing or irregular surface, and this resulted in a large percentage of deliveries being rejected by transformer manufacturers. The representatives of some of the transformer units stated that they could not rely on the quality of even L.T. bushings supplied by the indigenous porcelain factories and that they should, therefore, be free to import such bushings if necessary. We were also informed that indigenous bushings, in spite of their inferior quality, were priced 15 to 20 per cent. higher than imported bushings. The evidence received by us leaves no doubt that the production of electric porcelain is not yet established in the country on sound basis and that considerable effort is still needed on the part of this industry to improve the quality of its products. We think that the question of developing the electro-porcelain industry in the country deserves serious consideration. Although the requirements of the transformer industry are small, large quantities of porcelain insulators will be needed in the country as the various power development schemes are completed, and it is not desirable that we should continue to depend on imports for this material, especially when a nucleus of the electro-porcelain industry already exists in the country. We recommend that the Central Glass and Ceramics Institute, Calcutta, should try to bring about an improvement in the quality of indigenous bushings by giving the porcelain factories necessary technical advice and assistance. We understand that the Government of Mysore have adopted a scheme for expansion of the Porcelain Factory at Bangalore, in collaboration with a well-known Japanese firm. It is expected that on the completion of this scheme, the factory will have increased its capacity for electro-porcelain from 300 tons to 2000 tons per annum.



and that its range of manufacture will include high tension bushings from 11 KV to 66 KV. We recommend that every effort should be made to expedite the completion of this scheme.

(iii) Bushings, with or without metal parts, designed for power and distribution transformers are assessed to duty at  $5\frac{1}{4}$  per cent. *ad valorem*. Since the duty levied on power and distribution transformers is also  $5\frac{1}{4}$  per cent., it was agreed at the public inquiry that there was no case for considering a reduction in the duty on bushings.

(g) *Insulating materials:*

(i) The insulating materials used in transformers include varnished cambric tape and sleeveings, certain varieties of press board known under various trade names, such as elephantide, leatheroid, press-pahn, etc., and bakelite sheets and tubes. All these are imported.

(ii) Varnished cambric tape and sleeveings are dutiable at  $37\frac{1}{2}$  per cent. *ad valorem* standard and 25 per cent. *ad valorem* preferential, and bakelite tubes and elephantide at  $31\frac{1}{2}$  per cent. *ad valorem*. The industry has requested that the duties on these materials should be reduced to the level of the duty on transformers, namely  $5\frac{1}{4}$  per cent. *ad valorem*. From the data collected by the Commission regarding the cost of production of 5 sizes of indigenous transformers, it appears that the cost of these materials constitutes 1.8 to 3.7 per cent. of the total cost of production of transformers. The incidence of the duties on these materials on the cost of production of transformers is, therefore, small. If the duties on all these materials were reduced to  $5\frac{1}{4}$  per cent., the resultant reduction in the cost of production of transformers would be less than 1 per cent. Moreover, some of the materials, e.g., varnished cambric tapes and sleeveings and leatheroid, are used in the electric fan and motor industries. The Tariff Board did not support the claim of these industries to reduction of duties on the above materials, on the ground that these industries were well able to bear the burden. In view of

the facts stated above, we do not consider that the duties bear heavily on the transformer industry either. Since a reduction in the duties on the remaining items such as synthetic resin bonded paper tubes, elephantide, etc., is not likely to result in any material relief to the consumer, we do not think that such reduction is necessary.

(h) *Miscellaneous components:*

Similar considerations apply to items like silica gel breathers, thermometers, etc., which are relatively minor elements in the cost of production of transformers. Silica gel breathers are dutiable at  $5\frac{1}{2}$  per cent. *ad valorem* and thermometers at  $37\frac{1}{2}$  per cent. *ad valorem* standard and 25 per cent. preferential.

(i) *Transformer oil:*

Transformers to be used in tropical conditions have to be oil-cooled. Transformer oil, therefore, is one of the essential materials required by this industry. The oil is not produced in India. The total quantity required by the industry, on the basis of its rated capacity, is estimated at about 500,000 gallons. In order to provide for a relatively low temperature rise, transformers to be used in Indian conditions have to be filled with more oil than is contained in similar transformers used in foreign countries. The data supplied by a representative unit in Bombay showed its actual consumption of oil during the last six months to have averaged 1.1 gallons per KVA. Transformer oil is also needed for the maintenance of transformers and for the production and maintenance of certain other types of electrical equipment, e.g., switchgear. According to the information furnished by the Collectors of Customs, *vide* Appendix V, imports of transformer oil into India during 1950-51 and 1951-52 averaged 912,516 gallons per annum. The average annual production of transformers during 1950 and 1951 was 194,580 KVA and on the basis of the ratio of 1.1 gallon of oil per KVA, the quantity of transformer oil required for this production may be

estimated at about 214,000 gallons. Imports of transformer oil, have, thus, been much in excess of the probable consumption of the transformer industry which is the principal user of this material. Apart from small quantities required for other uses, it is possible that an appreciable proportion of imports has been utilised for building up stocks. In the case of an essential material like transformer oil, the level of stocks is largely influenced by expectations about prices and availabilities.

Transformer oil is assessed to duty at 27 per cent. *ad valorem* on a tariff value of Rs. 3/12 per gallon. Transformer oil contained in complete transformers, however, is not assessed separately, and therefore, pays a duty of  $5\frac{1}{4}$  per cent. *ad valorem*. This places the indigenous transformers at a definite disadvantage. In the case of 100 KVA transformers (11,000 volts/400 volts), the cost of transformer oil is estimated to form about 17 per cent. of the total cost of materials and about 11 per cent. of the ex-works cost of production. The difference of  $21\frac{3}{4}$  per cent. *ad valorem* between the duties on oil imported with transformers and that imported separately can make a difference of about 2.1 per cent. in the cost of transformers, and this, when taken in conjunction with the industry's disadvantages in respect of other materials, cannot be regarded as insignificant in a competitive market. There is, therefore, a strong case for reducing the duty on transformer oil. We accordingly recommend that the indigenous producers of transformers should be given a refund of so much of the customs duty on transformer oil as is in excess of  $5\frac{1}{4}$  per cent. *ad valorem* on the quantity of oil actually used by them in the manufacture of transformers. We are advised that the grant of this rebate should not present any administrative difficulties, since the volume of oil used in a transformer is always mentioned on the number plate attached to the transformer and the quantity used by a manufacturer in any period can, therefore, be easily verified. If however,

there are serious administrative difficulties in operating this refund, transformer oil imported with transformers should be assessed at the rate of duty applicable to transformer oil imported separately.

12. (a) Imports: Imports of transformers of all kinds into India since 1937-38 were as follows:-  
Imports and import control policy.

Year	Value of imports (in Rupees)	
1937-38	...	26,23,071
1938-39	...	25,62,716
1939-40	...	21,93,483
1940-41	...	19,11,763
1941-42	...	17,84,481
1942-43	...	13,44,309
1943-44	...	28,03,930
1944-45	...	55,63,894
1945-46	...	37,84,478
1946-47	...	42,91,696
1947-48	...	47,81,499
1948-49	...	1,09,98,258
1949-50	...	1,44,49,158
1950-51	...	1,50,54,661
1951-52	...	1,44,55,215

(Figures for the period up to August, 1947 include imports into territories which now constitute Pakistan). A statement showing a breakdown of these figures by principal countries of origin is given in Appendix VI.

We recommend that imports of power and distribution transformers should, in future, be recorded separately in trade statistics by numbers and the total KVA as well as by value and that such imports should be classified by voltages on the H.T. side as (i) upto 3.3 KV, (ii) above 3.3 to 6.6 KV, (iii) above 6.6 to 11 KV, (iv) 22 KV, (v) 33 to 37.5 KV and (vi) above 37.5 KV. Imports under each of these categories should be further classified by ratings as follows: (i) upto 25 KVA, (ii) above 25 to 75 KVA, (iii) above 75 to 250 KVA, (iv) above 250 to 500 KVA, (v) above 500 to 1,000 KVA, (vi) above 1,000 to 1,500 KVA, (vii) above 1,500 to 2,500 KVA and (viii) above 2,500 KVA.

(b) *Import Control Policy*: During January-June 1950, imports of transformers from the dollar and other currency areas were allowed subject to a monetary ceiling. During July-December, 1950, licences for imports from all currency areas, except Belgium and her possessions, were granted to established importers to the extent of 100 per cent. of one-half of their best year's imports. Licences were issued to actual users on an *ad hoc* basis. The same licensing policy was continued in 1951. Licences for imports from Japan were issued on an *ad hoc* basis to established importers and actual users. During January-June, 1952, general as well as soft currency licences for transformers up to 1,000 KVA and 22 KV on the H.T. side were granted to established importers to the extent of 20 per cent. of one-half of their best year's imports of transformers of this category only. In the case of other types of transformers, general as well as soft currency licences were granted to the extent of 100 per cent. of one-half of the best year's imports, but in calculating quotas, imports of transformers up to 1,000 KVA and 22 KV on the H.T. side were excluded. Licences to actual users were granted on an *ad hoc* basis. The same policy has been continued for July-December, 1952, except that the range of transformers included in the restricted category has been extended to 1,500 KVA and 22 KV on the H.T. side.

13. (a) From the evidence received by us, it seems that there are wide variations in the quality of transformers produced by different manufacturers in India. Quality of indigenous transformers. The representative of the Bombay Electric Grid stated at the public inquiry that the Grid had used transformers produced by three Indian manufacturers and had found them satisfactory. The South Madras Electric Supply Corporation also, in its letter to the Central Water and Power Commission, has expressed satisfaction about the performance of indigenous transformers. The Madras Electricity Department, on the other hand, which had occasion to place orders on five indigenous units, has

stated that in the case of transformers supplied by one of the units, the performance was generally unsatisfactory, that 2 per cent. of the transformers supplied by another unit failed owing to minor defects, that deliveries by the other three units were unduly delayed, owing to delays in the receipt of materials from abroad and that their transformers were consequently yet to be tried. The Tata Hydro-Electric Agencies, Ltd., have expressed the view that the quality of Indian transformers is of a lower standard as compared with that of imported transformers and that it shows signs of lack of skill in the manufacture and assembly of parts. The Calcutta Electric Supply Corporation has informed the Central Water and Power Commission that there was oil leakage in five out of six transformers supplied by a well-known Indian manufacturer. Oil leakage seems to be a common defect of transformers manufactured by some of the indigenous units. In some cases, it is due to defective welding of tanks. The representatives of the Government Electric Factory stated at the public inquiry that in their case, the defect was due to A.C. welding and that they had now changed to DC welding. We are advised, however, that A.C. welding is extensively used by transformer manufacturers in other countries and that the welding defects are probably due to lack of skill on the part of the workers. So far as the leakages in the body of the tank are concerned, it is possible to detect them by testing the tank with warm oil at a hydraulic pressure of 15 lbs. per square inch. Some of the manufacturers have the necessary equipment for carrying out this test. Leakages may also occur owing to the use of indigenous cork instead of imported cork. The latter is made of a special compound and is more suitable for this use. Sometimes the cooling tubes give way during the bending process and in some cases, it is the filter valves which leak. Some of the manufacturers have successfully overcome these difficulties by adopting a system of testing the tubes and valves before use.

(b) Another complaint against Indian transformers is that they are heavy and bulky as compared with imported transformers. This is admitted by the manufacturers who have explained it as principally due to their having to use a comparatively lower grade of silicon steel. The cross-section of the core made of such steel has to be built to larger proportions in order that the watt loss may be kept within prescribed limits. With a larger core, the quantity of winding wire required is also larger and so also the tank and the quantity of oil required. The representative of the Killick Industries Ltd., Bombay, informed the Commission at the public inquiry that Indian transformers showed higher losses than foreign transformers. The manufacturers, however, explained that there was no difficulty at all in producing transformers with losses equal to those of imported transformers, but that under Indian conditions, such transformers would have to be heavier and would also be more expensive. Since a lower grade steel had to be used in this country, a balance had to be struck between the objective of minimising the losses and that of keeping down the weight, and therefore, the cost of the transformer. Some users preferred lower losses and were prepared to pay more. Others were content with the standard product with the standard losses which tended to be somewhat higher than those of the imported product. The representative of Crompton Parkinson informed us that the British manufacturers had standardized the losses to a certain accepted figure and suggested that if Indian manufacturers also would come to an agreement with the principal users about a reasonable loss figure and then stick to that figure, there would be no room for complaint.

(c) Some users have also complained about the inferior finish of indigenous transformers.

(d) We recommend that the industry should take note of the defects pointed out by consumers, particularly the leakage of oil from tanks and inferior workmanship and

endeavour to remove such defects, wherever they still exist. The manufacturers who do not have adequate arrangements for testing finished transformers and parts should make such arrangements as early as possible.

(e) The Indian Standards Institution has formed a sub-committee for formulating standard specifications for transformers. We understand that the present specifications in the United Kingdom and other countries are likely to undergo revision in the near future and that the sub-committee has, therefore, decided to postpone consideration of this question for some time until the international specifications have been finalised.

14. It has been brought to our notice that the majority of Indian manufacturers have, in the past, failed to effect Period of deliveries within a reasonable period. In one delivery. instance cited by the Government of Madras, deliveries against orders placed in 1946 have still not been completed. The fact that the industry is dependent on imported raw materials is partly responsible for delays in delivery. In the case of the Government Electric Factory, however, much of the delay is due to the procedure prescribed for purchase of stores. We were informed at the public inquiry that the factory had to place its indents with the Stores Purchase Committee which took three to four months to place orders, and that a further period of three to four months elapsed before supplies were received from abroad. We consider that if the Government Electric Factory is to function as a commercial concern, a more expeditious procedure needs to be adopted for purchasing its requirements of raw materials and stores. We understand that in the case of the other units, there has already been a marked improvement in the matter of delivery periods. The Crompton Parkinson Works and the National Electrical Industries have informed us that they are now able to give deliveries within 13 weeks and five months respectively, while most users in India are content to receive deliveries within six



months. We recommend that the industry should continue its efforts to improve upon its delivery dates.

15. Transformers are assessed to duty under item 72(d) of the First Schedule to the Indian Customs Tariff. The Existing rate relevant extract from the Indian Customs of import duty. Tariff (36th Issue) is given below:

Item No.	Name of article	Nature of duty	Standard rate of duty	Preferential rate of duty if the article is the produce or manufacture of:		
				A The British Burma U.K. Colony		
72(d)	Control gear self acting or otherwise and transmission gear designed for use with any machinery above specified.	Revenue	10½% <i>ad valorem</i> *	..	...	Free

\* Under the Government of India, Ministry of Finance (Revenue Division) Notification No. 45-Customs dated 23rd October 1948, as subsequently amended by Ministry of Finance (Revenue Division) Notification No. 24-Customs dated 8th April, 1950 articles specified in this item, except belting, are exempt from payment of so much of the Customs duty leviable thereon to the extent of 5½% *ad valorem*.

16. (a) The Assistant Cost Accounts Officer attached to the Commission has examined the cost of production of transformers at the following two units, Commission's estimate of fair ex-works costs of transformers. namely, the National Electrical Industries, Ltd., Bombay and the Government Electric Factory, Bangalore. The National Electrical Industries is a public limited company with a paid-up capital of Rs. 10.35 lakhs. The Profit and Loss Account of the Company showed a loss of Rs. 2.85 lakhs up to the 31st March, 1950 and a small profit of Rs. 72,000 in the year ended 31st March, 1951. During 1951-52, however, the Company has made a profit of Rs. 3.66 lakhs. The

firm started the production of transformers only in September, 1949 and the losses incurred up to 31st March, 1950 were probably due to the fact that its production in this line was then not fully established. The present rated capacity of this unit is estimated at 60,000 KVA per annum and production in 1951-52 came up to two-thirds of this capacity. The Government Electric Factory is owned and run by the Mysore Government. The rated capacity of the factory which was 40,000 KVA in 1951 is expected to increase to 54,000 KVA in 1952-53. The factory produced 36,093 KVA in 1951-52. Details of costs of production of the two units have been given in a separate confidential enclosure\* to this Report. A brief description of the costing procedure, however, is given below, followed by the estimates of works costs and overheads prepared for each unit for 1951-52 and 1952-53.

(b) *Method of costing:* The following method was adopted to estimate the costs of production of individual types of transformers. The cost of materials and the direct labour charges incurred for individual types was first ascertained from the various job cards maintained at the factories. As regards other expenses, some of them are incurred for the transformer section as a whole, while others are incurred jointly for this and other sections of the factory (e.g.; electric motors). In the latter case, the share of the transformer section in the common expenses had to be estimated. In the case of power and fuel charges, the allocation between the transformer and other sections was made on the basis of horse-power worked, while the expenses under the other common items, except depreciation, were apportioned on the basis of the direct labour charges incurred in each section. Adjustments were made for items of a capital nature manufactured in the factory. Depreciation was calculated at the income-tax rates on the written-down value of plant and machinery and was distributed among the various sections on the basis of the value of plant and machinery employed in them. After ascertaining in

this way the total amount to be allocated to the transformer section on account of the various items of works costs other than materials and direct labour, the amount was allocated to individual types of transformers in proportion to direct labour. Interest on working capital and return on block were estimated for the transformer section as a whole and then apportioned to individual types of transformers in proportion to their total works costs.

(c) *Items selected for costing:* Estimates of costs of production have been made for the following types of transformers produced by the National Electrical Industries: 25 KVA, 150 KVA, 100 KVA, 250 KVA and 500 KVA, all with the voltage ratio of 11,000 volts/400 volts, 3 phase, 50 cycles, with standard fittings and oil. In the case of the Government Electric Factory, the following items were selected for costing: 50 KVA, 100 KVA and 300 KVA, with the voltage ratio of 13,200 volts/400 volts, and 200 KVA, with the voltage ratio of 11,000 volts/400 volts, all 3 phase, 50 cycles, with standard fittings and oil.

(d) *Production:* The cost estimates for 1952-53 are based on a production of 60,000 KVA in the case of the National Electrical Industries and 54,000 KVA in the case of the Government Electric Factory. In both cases, the estimated production for 1952-53 is 50 per cent. higher than the actual production in 1951-52.

(e) *Raw materials:* The position regarding the principal raw materials required by the industry has already been discussed above. In the case of both the units, the rates of consumption of the main raw materials recorded in 1951-52 are considered reasonable and have been adopted in estimating the future costs. The cost of materials, however, has been calculated on the basis of the latest purchase rates as shown by the books of the two units.

(f) *Other items of works costs:* These include labour, power and fuel, repairs and maintenance, consumable stores, establishment, general charges, packing, interest on working

capital and depreciation. The higher output assumed for 1952-53 is expected to result in an appreciable saving in the cost per unit of output under all items other than direct labour, power and fuel and packing. Interest on working capital has been allowed at 4½ per cent. per annum on an amount equal to four months' cost of production. Depreciation has been allowed at the normal income tax rates, after taking into account the value of the additional equipment expected to be installed during 1952-53.

(g) *Return on block*: The return on block has been allowed at 10 per cent. on the gross block in the case of each unit. The gross block of the transformer section of the National Electric Industries is estimated at Rs. 12.5 lakhs. In the case of the Government Electric Factory, the gross block employed in the transformer section was Rs. 7.09 lakhs on 31st March, 1952, but it is expected to increase to Rs. 8.59 lakhs during 1952-53.

(h) *Fair ex-works costs*: The fair ex-works costs of transformers produced by the two units for 1951-52 and 1952-53, as estimated by us, are shown in the following table:-

						1951-52 Rs.	1952-53 Rs.
National Electrical Industries:							
11 KV/400 V							
25 KVA	...	...	...	...	...	2,364	2,229
50 KVA	...	...	...	...	...	2,749	2,870
100 KVA	...	...	...	...	...	4,127	3,938
250 KVA	...	...	...	...	...	7,264	7,258
500 KVA	...	...	...	...	...	10,078	10,513
Government Electric Factory:							
13.2 KV/400-230 V							
50 KVA	...	...	...	...	...	2,955	2,896
13.2 KV/400 V							
100 KVA	...	...	...	...	...	3,414	3,191
11 KV/400-230 V							
200 KVA	...	...	...	...	...	5,738	5,479
13.2 KV/400 V							
300 KVA	...	...	...	...	...	9,359	8,543

17. The statement in Appendix VII gives the data supplied by two importing firms and the Collectors of

Comparison of landed costs of imported transformers and fair ex-works costs of indigenous transformers.

Customs regarding the c.i.f. prices and landed costs of imported transformers. It will be seen from the statement that c.i.f. prices and

landed costs are available for only six out of the nine types of transformers selected by us for estimating the domestic costs of production. These have been supplied by the Collectors of Customs, Calcutta, and relate to transformers produced by British manufacturers, such as British Thompson-Houston, Metropolitan Vickers, English Electric Co., etc. The prices reported by the Collector of Customs were those at which transformers of these makes were or could be imported at Calcutta during 1951 and 1952. The following table gives a comparison of the c.i.f. prices and landed costs of imported transformers and the fair ex-works costs of indigenous transformers for the six types for which comparative data are available.

	C.i.f. price	Duty @ 5½%	Clearing charges	Landed cost	Landed cost ex-cluding duty	Fair ex-works price (1952-53)	Difference between fair ex-works price and landed cost ex-duty	Difference as a percentage on c.i.f.
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	%
11 KV:								
25 KVA	1830	96	87	2013	1917	2229	312	17.05
50 KVA	2360	124	112	2596	2472	2870	396	16.86
100 KVA	3340	175	159	3674	3499	3938	439	13.14
2200 KVA	4920	258	224	5412	5154	5479	325	6.61
250 KVA	5640	296	268	6204	5908	7258	1350	23.94
500 KVA	9100	478	432	10010	9532	10513	981	10.78

The demand for individual types of transformers fluctuates from year to year and it would, therefore, be reasonable to take a simple average of the percentages shown in the last column above. On this basis, the average rate of duty required to equalise the landed costs of imported transformers with the fair ex-works costs of

indigenous transformers comes to 14.73 per cent. The existing rate of duty on transformers is 5 $\frac{1}{2}$  per cent.

18. We have carefully considered whether, on the basis of the data given above, the transformer industry is eligible for protection and if so, whether an increase in the import duty on transformers is called for. The industry is established on sound basis and the principle units are fairly efficient and well-managed. Both the Central and the State Governments have large schemes of power development in hand and the domestic requirements of power and distribution transformers will, therefore, be steadily increasing. It is desirable to encourage and assist the development of this industry, so that these requirements may be met from domestic sources to the maximum extent possible. The industry is already utilising indigenous materials to a considerable extent and the continued expansion of the industry will encourage the development of ancillary industries. During the last few years, the industry has made steady progress by way of widening the range of its output and improving the quality of its products. We, therefore, consider that the industry is eligible for protection. The difference between the domestic and foreign costs is not large and the industry has sufficient potentialities of development to enable it to dispense with protection within a reasonable period.

19. The industry is at present subject to several handicaps. Since the local supplies of extra special Measure of stalloy grade sheets are limited, the industry protection. is unable to use steel of the same quality as is used in imported transformers. We have recommended, in para. 11(i) above, a refund of a portion of the duty on transformer oil, but in the case of certain other materials, we have not been able to recommend a reduction in the import duties because of its possible adverse effects on other industries. The current prices of some of these

materials, particularly, DCC and DPC wires, are also high in comparison with those at which the materials are available to foreign manufacturers. The figures given in the preceding paragraph show that a duty of 14.73 per cent. *ad valorem* is required to equalise the landed costs of imported transformers with the fair ex-works costs of indigenous transformers. On the other hand, in certain recent tenders received by the Government of India and the Bombay Electric Grid, the prices quoted by certain British firms were higher than those quoted by Indian firms. On an examination of the data regarding the c.i.f. prices, however, it appears that the higher prices charged by the British firms were probably due to the additions made by such firms on account of their selling and distribution charges, and that it may be possible for such firms to quote lower prices by reducing their margins, when increased supplies are available from abroad. We have also received evidence to the effect that certain continental producers (e.g., Austrian, German or Swedish) are able to quote appreciably lower prices than those charged either by Indian or British producers. Although the U.K. still remains the principal source of supply, the share of other countries in the Indian market is slowly increasing (*vide* Appendix VI). Competition from all sources is at present restricted owing to import control, and the scope of import restrictions has recently been widened to cover transformers upto 1,500 KVA and 22 KV. We are advised, however, that the difference between the prices of Indian and Continental transformers is often so large (about Rs. 1,000 in the case of 500 KVA transformers of 11,000 KV/400 KV) that large indentors are generally reluctant to place their entire orders with Indian producers and, that import control would become less irksome and its administration should be facilitated, if the difference between Indian and Continental prices were to become narrower than it is. Taking all these considerations into account, we recommend that the import duty on power and distribution transformers upto 2,500 KVA and 37.5 KV should be increased

from the present level of 5 per cent. *ad valorem*, exclusive of surcharge, to 10 per cent. *ad valorem*, exclusive of surcharge, and that the duty should be converted into a protective duty. Until October 1948, transformers were subject to duty at 10 per cent. *ad valorem* and we do not think that the rate of duty recommended by us will be unduly burdensome either to the electric supply undertakings or to the consumers of electricity. The refund of a portion of the import duty on transformer oil recommended by us will partially bridge the gap between the rate of 10 per cent., exclusive of surcharge, suggested above and the duty of 14.73 per cent. indicated by a comparison of the landed costs of imported transformers with the fair ex-works prices of indigenous transformers. We recommend, further, that the protective duty should remain in force upto 31st December 1955.

20. We consider the industry obtains considerable incidental benefit from the restrictions imposed at present on imports of transformers and we recommend that <sup>Other</sup> assistance. so long as the quality of domestic transformers continues to be satisfactory and the prices and delivery periods are reasonable, import restrictions should be so administered as to ensure the fullest utilization of domestic capacity. We recommend, further, that both the Central and the State Governments should adopt a policy of purchasing their requirements of transformers from indigenous producers as far as possible. The major electric supply undertakings should also be requested to adopt a similar policy. The requirements of Government Electricity Departments and large private electricity undertakings account for a large proportion of the total demand for transformers and hence the purchase policies adopted by this class of consumers can materially influence the development of the domestic transformer industry.



21. The grant of protection to this industry should be subject to the conditions that the industry will maintain its prices at a reasonable level, strive for reduction in costs and improvement in quality and endeavour to meet the domestic demand for the types of power and distribution transformers covered by this inquiry to the fullest possible extent.

22. If the recommendation in paragraph 19 is accepted, it will be necessary to insert a new item in the First Changes in the Indian Schedule to the Indian Customs Tariff Customs Tariff. on the following lines:-

Item No.	Name of article	Nature of duty	Standard rate of duty	Duration of protective duty
	Power and distribution transformers upto 2500 KVA and 37.5 KV on the H.T. side (Primary voltage being over 250) excluding furnace, rectifier and flame-proof transformers.	Protective	10½ per cent. ad valorem.	31st December, 1955.

23. Our conclusions and recommendations are summarized below:-

Summary of conclusions and recommendations. (1) The scope of the inquiry is limited to power and distribution transformers upto 2500 KVA and 37.5 KV (plus the usual tapping allowance) on the H.T. side. [Paragraph 4]

(2) The total demand for power and distribution transformers upto 33 KV which is likely to result from the projected expansion of power supply during the period of the First Five Year Plan is estimated at 2,350,000 KVA. [Paragraph 8(b)]

(3) The present annual rated capacity of the industry is estimated at 370,000 KVA. Two of the existing units

have schemes of expansion, and two new units are expected to come into production in the near future. When these projects are implemented, the rated capacity of the industry is expected to increase to 485,000 KVA per annum. The industry produced three-phase transformers to the extent of 84,842 KVA in 1949, 153,181 KVA in 1950, 183,164 KVA in 1951 and 65,036 KVA in the first four months of 1952. Production of single-phase transformers was 12,951 KVA in 1949, 24,683 KVA in 1950, 28,132 KVA in 1951 and 5,547 KVA in the first four months of 1952. The bulk of the production consists of ratings up to 1,000 KVA and 11 KV on the H.T. side. The Development Wing of the Ministry of Commerce and Industry should carry out a technical investigation of the extent of facilities available at each unit, with a view to obtaining more accurate data about the highest ratings upto which transformers can be produced by each unit. [Paragraphs 4, 9 and 10]

(4) Imports of stalloy sheets and laminations should be so regulated as to promote a fuller utilization of the domestic capacity for the production of these materials. [Paragraph 11(c) (ii)]

(5) The prices quoted by the Sankey Electrical Stampings for transformer laminations are reasonable, but the firm should try to reduce the percentage of wastage in the manufacture of laminations with a view to reducing its costs. [Paragraph 11(c) (iv)]

(6) Some of the manufacturers of transformers have stated that the indigenous stalloy sheets suffer from lack of uniformity in thickness. Tatas should try to remove this defect and also continue their efforts to produce adequate quantities of sheets with a watt loss comparable to that of high grade imported sheets. [Paragraph 11(c) (v)]

(7) The prices charged by the Indian Cable Co., for DCC and DPC wires and strips and those charged by the National Insulated Cable Co., for DCC wires are excessive.

The two companies should be asked to reduce their prices, so as to bring them in fair relation to their costs. Government should keep a watch over the prices of indigenous DCC and DPC wires and strips with a view to ensuring that they are maintained at a reasonable level. [Paragraph 11(d) (v)]

(8) The Central Glass and Ceramic Research Institute, Calcutta, should try to bring about an improvement in the quality of indigenous bushings by giving the porcelain factories necessary technical advice and assistance. [Paragraph 11(f) (ii)]

(9) The Government of Mysore should make every effort to expedite the completion of their scheme for the expansion of the porcelain factory at Bangalore. [Paragraph 11(f) (ii)]

(10) The domestic producers of transformers should be given a refund of so much of the customs duty on transformer oil as is in excess of 5½ per cent. *ad valorem* on the quantity of transformer oil actually used by them in the manufacture of transformers. If, however, there are serious administrative difficulties in operating this refund, transformer oil imported with transformers should be assessed at the rate of duty applicable to transformer oil imported separately. [Paragraph 11(i)]

(11) No reduction is recommended in the import duties on silicon steel sheets, copper wires and strips, cooling tubes, bushings, insulating materials (insulating paper, bakelite tubes, leatheroid, elephantide, press-pahn, etc.), miscellaneous components like silica gel breathers, thermometers, etc. for reasons stated in paragraph 11(c) (iv), (d) (vi), (e) (iv), (f) (iii) and (g) (ii).

(12) Imports of power and distribution transformers should in future be recorded separately in trade statistics by numbers and the total KVA, as well as by value, and should be classified by voltages on the H.T. side and by ratings. [Paragraph 12]

(13) The industry should take note of the defects pointed out by consumers, particularly the leakage of oil from tanks and inferior workmanship, and endeavour to remove the defects, wherever they still exist. The manufacturers who do not have adequate arrangements for testing finished transformers and parts, should make such arrangements as early as possible. [Paragraph 13(d)]

(14) The industry should continue its efforts to improve upon its delivery dates. [Paragraph 14]

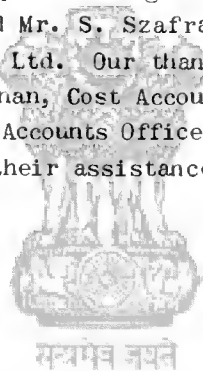
(15) The import duty on power and distribution transformers upto 2,500 KVA and 37.5 KV should be increased from the present level of 5½ per cent. *ad valorem* to 10½ per cent. *ad valorem* and should be converted into a protective duty. The protective duty should remain in force upto 31st December, 1955. [Paragraph 19]

(16) The present system of import restrictions, though imposed for balance of payments reasons, has been of much benefit to this industry and it is recommended that so long as the quality of domestic transformers continues to be satisfactory and the prices and delivery periods are reasonable, import restrictions should be so administered as to ensure the fullest utilisation of domestic capacity. [Paragraph 20]

(17) The Central and State Governments should adopt a policy of purchasing their requirements of transformers from indigenous producers as far as possible. The major electric supply undertakings should also be requested to adopt a similar policy. [Paragraph 20]

(18) The grant of protection to this industry should be subject to the conditions that the industry will maintain its prices at a reasonable level, strive for reduction in costs and improvement in quality and endeavour to meet the domestic demand for the types of power and distribution transformers covered by this inquiry to the fullest possible extent. [Paragraph 21]

24. We wish to express our thanks to the representatives of producers, users and importers as well as the representatives of the Central and State Governments, who gave oral or written evidence in this inquiry. We are thankful to the Central Water and Power Commission who supplied us with a most useful memorandum giving information on various aspects of this industry. We have received much valuable advice and assistance from Shri P.N. Deobhakta, Deputy Development Officer, Development Wing, Ministry of Commerce and Industry, who acted as our Technical Adviser for the purpose of this inquiry, Shri H.S. Kulkarni, Deputy Chief Engineer, Central Water and Power Commission and Mr. S. Szafranski of the National Electrical Industries Ltd. Our thanks are due to them, as also to Shri N. Krishnan, Cost Accounts Officer, Shri S.V. Rajan, Assistant Cost Accounts Officer and Shri V.S.S. Rajan, Cost Accountant for their assistance in carrying out this investigation.



B.V. NARAYANASWAMY,  
Member

B.N. ADARKAR,  
Member

D.K. MALHOTRA,  
Secretary.

Bombay,  
Dated 15th October, 1952.

## APPENDIX I

(Vide paragraph 1)

GOVERNMENT OF INDIA  
MINISTRY OF COMMERCE

New Delhi, the 23rd December, 1950.

RESOLUTION  
(Tariffs)

No. I-T/A(52)/49.- In pursuance of paragraphs 2 and 7 of their Resolution in the Department of Commerce No.218-T-(55)/45 dated the 3rd November 1945, and paragraph 4 of their Resolution bearing the same number dated the 16th February 1946, the Government of India have decided to refer to the Tariff Board for investigation an application for assistance or protection received from the transformers industry.

2. In conducting its enquiry the Board will be guided by the principles laid down in paragraph 5 of the Resolution dated the 3rd November 1945, referred to in paragraph 1 above.

3. Firms or persons interested in the industry or in industries dependent on the use of this article who desire that their views should be considered by the Tariff Board, should address their representations to the Secretary to the Board, Contractor Building, Nicol Road, Ballard Estate, Bombay-1.

Sd./- S. RANGANATHAN,

*Joint Secretary to the Government of India.*

## APPENDIX II

[Vide paragraph 3(b)]

List of parties to whom questionnaires were issued and from whom replies were received.

- \* Those who have sent replies.
- @ Those who have furnished their reply through C.W. & P. Commission.
- # Not interested.

## PRODUCERS:

- \* 1. National Electrical Industries Ltd.,  
Industrial Estate, Lal Baug, Bombay.
- \* 2. Crompton Parkinson (Works) Ltd.,  
Haines Road, Worli, Bombay.
- \* 3. Radio Lamp Works Ltd.,  
Kamani Chambers, Ballard Estate, Bombay.
- \* 4. Government Electric Factory,  
Mysore Road, Bangalore.
- \* 5. Radio & Electricals Ltd.,  
No. 2, Lattice Bridge Road, Adyar, Madras.
- \* 6. Electric Construction & Equipment Co. Ltd.,  
51/2, Hazara Road, Calcutta.
- \* 7. Associated Electrical Industries Manufacturing Co. Ltd.,  
'Crown House', 3, Mission Row, Calcutta.
- # 8. Greaves Cotton & Co.,  
1, Forbes Street, Bombay.
- # 9. Kaycee Industries,  
Kamani Chambers, Ballard Estate, Bombay.
- #10. Electro Mechanical Engineering Works,  
Amarwadi, Khattargali, Bombay.
- #11. P.S.G. & Sons Charity Industrial Institute,  
Peelamedu, P.O. Coimbatore (S. India).
- #12. The Mysore Electrical Industries Ltd.,  
P.B. No. 61, Bangalore.

## ASSOCIATIONS:

- \* 1. Indian Electrical Manufacturers' Association,  
35, Stephen House, Dalhousie Square, Calcutta.
- \* 2. All India Manufacturers' Organisation,  
Industrial Assurance Building, Churchgate Street, Bombay.

## CONSUMERS:

- \* 1. The Tata Hydro Electric Agencies Ltd.,  
Bombay House, Bruce Street, Bombay.
- \* 2. Killick Industries Ltd.,  
Electricity House, Santacruz, Bombay.
- \* 3. The Federation of Electricity Undertaking of India,  
Killick Building, Hose Street, Fort, Bombay.
- \* 4. Sijua (Jherria) Electric Supply Co. Ltd.,  
Bansjora P.O., Bihar.
- \* 5. The Calcutta Electric Supply Corporation Ltd.,  
Victoria House, Chowranghee Square, Calcutta.
- \* 6. Martin Burn Ltd.,  
12, Mission Row, Calcutta.
- \* 7. Octavius Steel & Co.,  
P.B. No. 38, Calcutta.
- \* 8. Andrew Yule & Co.,  
(Dishargarh Power Supply Co. Ltd.), 8, Clive Row,  
Calcutta.
- \* 9. The Association of Electric Supply Companies U.P. & Delhi,  
C/o Martin Burn Ltd., Calcutta.
- \* 10. The Association of Electricity Undertaking, Bengal,  
Victoria House, Calcutta.
- \* 11. The Association of Electricity Undertaking, Bihar  
& Orissa, C/o Octavius Steel Co. Ltd.; P.B. No. 38,  
Calcutta.
- \* 12. The Association of Electrical Undertaking of Bombay  
Province, Killick House, Hose Street, Bombay.
- \* 13. South Madras Electric Supply Corporation Ltd.,  
Tiruchirapalli.
- \* 14. The Madras Presidency Electric Licences Association Ltd.,  
10, Mount Road, Madras.
- \* 15. B.E.S. & Transport Committee,  
Electric House, Fort, Bombay.
- \* 16. The Superintendent Engineer Madras Electricity System,  
157, Mount Road, Madras.
- #17. The Superintendent Engineer Pykara Electricity System,  
Coimbatore.
- \* 18. The Superintendent Engineer Mettur Electricity System,  
Mettur.
- \* 19. Chief Electrical Engineer to the Government of Mysore,  
Bangalore.
- \* 20. Chief Electrical Engineer to the Government of  
Travancore-Cochin, Trivandrum.



## CONSUMERS: (Contd.)

- \*21. The Superintendent Engineer, Andhra Power System,  
Vijayawada.
- \*22. Kanpur Electric Supply Co. Administration, Govt. of U.P.,  
Electricity House, Kanpur.
- \*23. The Hydro Electric Engineer,  
U.P. Government (P.W.D. Irrigation), Roorkee.
- \*24. The Chief Engineer, East Punjab P.W.D.,  
Electricity Branch, Simla.

## IMPORTERS:

- 1. International General Electric Co. (India) Ltd.,  
Thackersey House, Graham Road, Ballard Estate, Bombay.
- 2. British Insulated Callender's Cables Ltd.,  
Esplanade House, Waudby Road, Bombay.
- 3. General Electric Co. (India) Ltd.,  
Magnet House, Dougall Road, Ballard Estate, Bombay.
- 4. Guest Keen Williams Ltd.,  
Das Chambers, 25, Dalal Street, Bombay.
- 5. The English Electric Co. Ltd.,  
P.O. Box No. 752, Bombay.
- \* 6. Ahmedabad Mfg. Calico Printing Co. Ltd.,  
P.O. Box. No. 12, Ahmedabad.
- 7. Steam & Mining Equipment Co. Ltd.,  
101, Park Street, Calcutta 16.
- \* 8. C.A. Parsons & Co. Ltd.,  
12, Mission Row, Calcutta.
- # 9. The Steel Corporation of Bengal Ltd.,  
12, Mission Row, Calcutta.
- \*10. A. Reyzzle & Co. Ltd.,  
12, Mission Row, Calcutta.
- 11. Easun Engineering Co. Ltd.,  
2nd Line Beach, Madras.
- \*12. Parry & Co. Ltd.,  
Madras.
- 13. Binny & Co. (Madras) Ltd.,  
Agents in South India for the English Electric Co. Ltd.,  
7, Armenian Street, Madras.
- 14. Associated Electric Industries (India) Ltd.,  
Crown House, 3, Mission Row, Calcutta.
- 15. Shri Venkata Mills Ltd.,  
Udumelpet.
- \*16. Indian Copper Corporation Ltd.,  
Ghatsila.

## SUPPLIERS OF RAW MATERIALS:

- \* 1. Sankey Electric Stampings Ltd.,  
P.O. Box No. 121/A, Bombay.
- \* 2. Tata Iron & Steel Co. Ltd.,  
Bombay House, Bruce Street, Bombay.
- \* 3. Premier Automobiles Co.,  
Kurla, Bombay.
- # 4. The Hindustan Motors Ltd.,  
Royal Exchange Place, Calcutta.
- \* 5. National Insulated Co. of India Ltd.,  
Stephen House, 4, Dalhousie Square, Calcutta.
- \* 6. Indian Cable Co. Ltd.,  
9, Hare Street, Calcutta.
- \* 7. Government Porcelain Bushing Factory,  
Bangalore.
- \* 8. Bombay Potteries & Tiles Ltd.,  
United India Building, Sir P.M. Road, Bombay.
- # 9. Gwalior Potteries,  
Madhya Bharat, Gwalior.
- \*10. Bengal Potteries,  
45, Tangra Road, Calcutta.
- #11. Government Porcelain Factory,  
Kundra (Travancore-Cochin).
- 12. The Mysore Paper Mills Ltd.,  
Bangalore.
- 13. Goodlass Wall Ltd.,  
Forbes Building, Home Street, Bombay.
- \*14. Elephant Oil Mills Ltd.,  
Ruston Building, Churchgate Street, Bombay.
- #15. Jenson & Nicholson (India) Ltd.,  
Mackinnon's Building, Ballard Estate, Bombay.

## APPENDIX III

[Vide paragraph 3(e)]

List of persons who attended the public inquiry on 30th June  
and 1st July, 1952.

## PRODUCERS:

1. Mr. S. Szafranski	}	Representing	The National Electrical Industries Ltd., Lal Baug, Bombay-12.
2. Mr. W.P. Karnik			
3. Mr. V. Srinivasa Rao	}	"	Government Electric Factory, Bangalore.
4. Mr. P. Rangaswamy			
5. Mr. J. Carey-Brown		"	The Associated Electrical Industries Manufacturing Co., Ltd.; 'Crown House', Mission Row, Calcutta.
6. Mr. P.R. Deshpande	}	"	(1) Crompton Parkinson (Works) Ltd., Worli, Bombay-18. (2) Indian Electrical Manufacturers' Association, Calcutta.
7. Mr. V.V. Dhume			
8. Mr. V. Rama Rao		"	Radio & Electricals Ltd.; Adyar, Madras-20.
9. Mr. L.P. Shah		"	(1) Electric Construction & Equipment Co. Ltd., P.O. Box 7875, Calcutta. (2) Indian Electrical Manufacturers' Association, Calcutta.
10. Mr. P.H. Gidwani		"	Radio Lamp Works Ltd., Kamani Chambers, Nicol Road, Bombay.
11. Mr. Ravi L. Kirloskar	}	"	Kirloskar Electric Co. Ltd., Bangalore.
12. Mr. S.G. Ramachandra			

## ASSOCIATIONS:

1. Mr. P.B. Advani	"	All India Manufacturers Organisation, Bombay.
2. Mr. D.K. Sinha	"	Indian Electrical Manufacturers' Association, Calcutta (Also represented by Messrs. P.R. Deshpande & L.P. Shah).

## IMPORTERS:

1. Mr. J.E.W. Grainge	}	Representing The British Electrical & Allied Manufacturers Association, Calcutta and also the English Electric Co. Ltd., Bombay.
2. Mr. J.J. Haines		
3. Mr. K.J. Maneckji	"	Parry & Co. Ltd., Bombay.
4. Mr. H.B. Carrasco	"	The General Electric Co. of India Ltd., P.O. Box 861, Bombay.

## CONSUMERS:

1. Mr. M. Karuven	"	The Tata Hydro Electric Agencies, Bruce Street, Bombay.
2. Mr. N.P. Kripalani	"	Killick Industries Ltd., Home Street, Bombay.
3. Mr. N.C. Javeri	"	Consolidated Electric Agencies Ltd., P.O. Box 879, Bombay.

## SUPPLIERS OF RAW MATERIALS:

1. Mr. R.F.S. Talyarkhan	}	The Tata Iron & Steel Co. Ltd., Bruce Street, Bombay.
2. Mr. A.S. Daruwalla		
3. Mr. D.R. Dhanbhoora		
4. Mr. F. Mogal Esq.		
5. Mr. K.C. Maitra	"	Sankey Electrical Stampings Ltd., P.O. Box 121, Bombay.
6. Mr. S.K. Shah	"	The Premier Automobiles Ltd., Kurla.
7. Mr. C.P. Shah	"	Bombay Potteries and Tiles Ltd., Kurla.
8. Mr. J.K. Patel	"	J. Stone & Co. (India) Ltd., Bombay.
9. Mr. W.F. Freestone	"	C.C. Wakefield & Co., Ltd., Bombay.

## OFFICIALS:

1. Mr. P.N. Deobhaktha	"	Ministry of Commerce & Industry (Development Wing), New Delhi.
2. Mr. H.S. Kulkarni	"	Central Water & Power Commission, Simla.
3. Mr. K.B. Vagholkar	"	Directorate of Industries, Bombay.
4. Mr. V.R. Vaidya	"	Bombay Electric Grid Office, Bombay.

## APPENDIX IV

[Vide paragraph 8(d)]

Statement showing the estimated requirements of transformers for the major electric supply undertakings in India during next three years.

Undertaking	Particulars of transformers					Total of all classes
	3.3 KV	6.6 KV	11 KV	22 KV	33 KV	
	KVA	KVA	KVA	KVA	KVA	KVA
Calcutta E.S. Corporation	-	-	-	-	-	60,000*
Government of Bombay	400	-	17,875	-	4,200	22,475
Government of PEPSU	-	-	10,325	-	-	10,325
Government of Madras	-	-	-	-	-	30,000*
Government of Orissa	875	-	2,150	-	5,950	8,975
Ahmedabad E.S. Co.	-	-	-	-	-	4,800*
Surat E.S. Corporation	-	-	-	-	-	3,000*
Bombay Suburban E.S. Corporation.	-	-	12,000	-	-	12,000
Rajasthan Government	-	-	-	-	-	8,000*
Octavius Steel Co. Ltd.	-	-	-	-	-	6,000*
South Madras E.S. Corporation.	-	-	12,720	9,850	-	22,570
Madhya Bharat Government	900	900	-	-	-	1,800
Saurashtra Government	-	-	6,200	-	10,900	17,100
Kanpur E.S. Administration	-	3,550	-	-	-	3,550
Vengalpatam E.S. Co. Ltd.	-	-	-	-	-	200
Chennai E.S. Corporation	-	-	-	-	-	325
Madhya Pradesh Government	-	-	-	-	-	8,000
Punjab Government	-	-	100,000	-	25,000	125,000*
Jammu & Kashmir Government	-	-	2,955	-	-	2,955
Bihar Government	-	-	6,250	-	-	6,250*
Bombay E.S.T. Co.	-	-	-	-	-	6,000*
Government of U.P.	-	-	-	-	-	40,000*
Government of Mysore	-	-	-	-	-	135,000
Government of West Bengal	-	1,000	-	-	1,500	2,500
Hyderabad Government	-	34,250	21,625	-	1,200	57,075
Travancore-Cochin Government.	-	-	-	-	-	70,000*
Western Railway	500	1,000	1,550	-	-	3,050
Central Eastern Railway	-	1,870	-	-	-	1,870
Northern Railway	450	8,250	-	-	450	9,150**
		(5000V)				
Eastern Railway	2,275	-	-	-	-	2,275
TOTAL						680,245

\* The break-down of the requirements into different sizes has not been furnished by these States.

\*\* For 1952 only.

# APPENDIX V

[Vide paragraph 11(1)]

Imports of transformer oil into India as reported by the Collectors of Customs.

(In gallons)

	<u>1949-50</u>	<u>1950-51</u>	<u>1951-52</u>
Through Madras Port	82,164	1,19,035	2,19,435
Through Calcutta Port	4,19,287	2,77,163	2,61,170
Through Bombay Port	Not <u>available</u>	6,23,604	3,22,625
TOTAL:	<u>5,01,451</u>	<u>10,19,802</u>	<u>8,03,230</u>



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# APPENDIX VI

[Vide paragraph 12(a):

Statement showing countrywise breakdown of the total value of imports of transformers into India from 1937-38 to 1951-52.

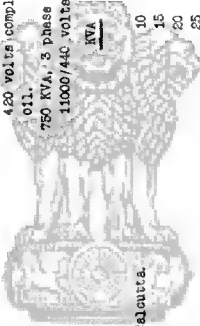
Countries of Consignment.	1937-38	1938-39	1939-40	1940-41	1941-42	1942-43	1943-44	1944-45	1945-46	1946-47	1947-48	1948-49	1949-50	1950-51	1951-52
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1. United Kingdom (including Channel Islands)	184,658	189,176	1,08,712	1,02,377	15,774	12,561	87,781	1,39,008	3,58,558	4,19,028	4,12,747	914,740	11,07,742	5,31,162	9,82,365
2. Canada	-	-	-	-	1,288	-	-	-	-	-	-	-	1,326	-	-
3. Other Common- wealth countries.	-	459	-	1,153	1,250	-	-	-	-	878	251	-	5,800	34	-
4. Sweden	1,80,031	1,39,128	81,716	48,700	-	-	-	-	877	5,229	2,721	-	1,272	5,296	3,577
5. Germany	50,338	1,76,981	9,855	-	-	-	-	-	-	-	-	-	-	3,285	9,19,772
6. Netherlands	-	-	-	-	-	-	-	-	-	-	-	-	1,784	5,484	1,653
7. Belgium	1,75,949	2,25,006	44,613	7,285	-	-	-	-	-	3,853	1,50,85	4,171	1,27,619	2,84,346	8,28,108
8. France	-	2,286	10,411	3,035	-	-	-	-	97,840	-	-	-	-	-	1,8500
9. Switzerland	47,116	80,977	5,616	6,163	75,438	87,15	1,82	791	-	-	-	-	-	-	-
10. Italy (including Flume).	1,62,51	44,386	8,279	-	-	-	-	-	-	-	-	-	-	87,946	7,694
11. Austria	1,841	44,65	-	-	-	-	-	-	-	-	-	-	-	-	-
12. Hungary	74,94	9,01	54,67	8,880	-	-	-	-	-	-	-	-	-	-	-
13. Czechoslovakia	644	3,297	12,143	-	-	-	-	-	-	-	-	-	-	-	-
14. Japan	-	-	-	-	-	-	-	-	-	-	-	-	-	4,03,67	24,54,50
15. United States of America.	80,788	54,851	1,91,168	83,316	1,30,028	634,48	581,130	54,884	3,50,416	55,440	8,99,948	1,00,432	2,86,282	54,15,91	20,12,511
16. Other foreign countries.	-	646	2,235	765	-	-	352	63	27	-	-	880	-	-	-
TOTAL	2,88,071	2,88,276	2,28,345	1,91,175	1,78,481	1,34,379	2,80,380	5,39,894	3,79,476	4,33,186	4,76,169	10,98,858	14,44,158	15,04,681	14,55,215

# APPENDIX VII

[Vide paragraph 17]

Statement showing the c.i.f. and total landed cost of transformers for the year 1952.

Name of the Importer	Date of Import	Type and Specification		C.i.f. plus customs duty at 5½%	Landed cost
		1.	2.		
1. Parry & Co. Ltd., Madras.	Jan.-April '52.	6.6/11 KV, 1000 KVA ± No.	289 13- 1- 4		
2. The Calico Mills, Ahmedabad.	-do-	11000/400. 4 Nos. (about 1000-1500 KVA).	-		168732- 0- 0
3. Collector of Customs, Bombay.		750 KVA, 3 phase 50 cycles 21478- 0- 0 complete with oil. 250 KVA, 3 phase 50 cycles 7680- 0- 0 11000/410 volts complete with oil. 300 KVA, 50 cycles, 10500/ 9368- 0- 0 420 volts complete with oil. 750 KVA, 3 phase 50 cycles 16435- 5- 4 11000/440 volts.			
4. Collector of Customs, Calcutta.					



सत्यमेव जयते

3.3 KV 6.6 KV 11 KV		3.3 KV 6.6 KV 11 KV		3.3 KV 6.6 KV 11 KV	
Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1,000	1,107	1,370	1,400	1,817	1,407
1,230	1,248	1,480	1,350	1,368	1,688
1,280	1,370	1,570	1,366	1,400	1,727
1,370	1,500	1,830	1,507	1,650	2,013
1,580	1,630	1,850	1,672	1,793	2,035
1,770	1,880	2,020	1,947	2,068	2,222
2,040	2,130	2,380	2,244	2,343	2,596
2,530	2,656	2,960	2,783	2,921	3,196
3,000	3,140	3,340	3,500	3,454	3,673
-	4,052	4,230	-	4,456	4,653
-	4,780	4,920	-	5,258	5,412
-	5,486	5,640	-	6,034	6,204
6,060	6,178	6,310	6,660	6,782	6,941
7,550	7,572	7,780	8,305	8,329	8,558
9,000	9,038	9,100	9,800	9,842	10,010
13,000	13,059	14,000	14,300	14,375	15,400
16,010	16,174	16,200	17,610	17,791	17,820
22,110	22,250	22,520	24,330	24,775	24,750
-	27,800	28,400	-	30,590	31,240
-	33,577	35,750	-	36,934	37,075



## LIST OF REPORTS OF THE INDIAN TARIFF BOARD

### I. TARIFF INQUIRIES

#### (A) NEW CASES

1. Sodium thiosulphate, sodium sulphite (anhydrous) and sodium bisulphite (1946).	PTB 158
2. Bichromates (1946).	PTB 157
3. Phosphates and phosphoric acid (1946).	PTB 156
4. Butter colour and aerated water powder colour (1946).	PTB 154
5. Calcium chloride (1946).	PTB 153
6. Coated abrasives (other than grinding wheels) (1946).	PTB 159
7. Hurricane lanterns (1946).	PTB 152
8. Cocoa powder and chocolate (1946).	PTB 155
9. Wood screws (1946).	PTB 97
10. Bicycles (1946).	PTB 100
11. Caustic soda and bleaching powder (1946).	PTB 88
12. Antimony (1946).	PTB 94
13. Sewing machines (1946).	PTB 101
14. Aluminium (1946).	PTB 90
15. Steel baling hoops (1946).	PTB 87
16. Preserved fruits (1946).	PTB 145
17. Non-ferrous metals (1946).	PTB 146
18. Cotton textile machinery (ring frames, spindles and spinning rings) (1947).	PTB 111
19. Rubber manufactures (1947).	PTB 110
20. Sodium and potassium metabisulphites (1947).	PTB 105
21. Alloy tool and special steel (1947).	PTB 118
22. Sodium sulphide (1947).	PTB 102
23. Electric motors (1947).	PTB 112
24. Dry battery (1947).	PTB 115
25. Plywood and teacheasts (1947).	PTB 113
26. Cotton and hair belting (1947).	PTB 121
27. Starch (1947).	PTB 103
28. Glucose (1947).	PTB 104
29. Chloroform, ether, sulphuric p.b. and anaesthetic and potassium permanganate (1947).	PTB 109
30. Fire hose (1947).	PTB 120
31. Steel belt lacing (1947).	PTB 119
32. Ferro-silicon (1947).	PTB 116
33. Oleic acid and stearic acid (1947).	PTB 117
34. Machine tools (1947).	PTB 114
35. Wire healds (1948).	PTB 123
36. Pickers (1948).	PTB 125

37. Motor vehicle batteries (1948).	PTB 122
38. Hydraulic brake fluid (1948).	PTB 129
39. Bobbins (1948).	PTB 128
40. Slate and slate pencils (1949).	PTB 138
41. Expanded metals (1949).	PTB 150
42. Cotton textile machinery (ring frames, spindles, spinning rings and plain looms) (1949).	PTB 167
43. Small tools (1949).	PTB 149
44. Plastics (1949).	PTB 160
45. Soda ash (1949).	PTB 165
46. Glass and glassware (1950).	PTB 174
47. Sterilised surgical catgut (1950).	PTB 184
48. Liver extract (1950).	PTB 185
49. Fountain pen ink (1950).	PTB 183
50. Pencils (1950).	PTB 187
51. Fine chemicals (1950).	PTB 182
52. Sago (1950).	PTB 186
53. Belt fasteners (1950).	PTB 189

## (B) REVIEW CASES

(Continuance of Protection)

1. Iron and steel manufactures (1947).	PTB 106
2. Paper and paper pulp (1947).	PTB 108
3. Cotton textile manufactures (1947).	PTB 98
4. Sugar (1947).	PTB 107
5. Magnesium chloride (1948).	PTB 124
6. Silver thread and wire (1948).	PTB 126
7. Bicycles (1949).	PTB 131
8. Artificial silk (1949).	PTB 132
9. Sericulture (1949).	PTB 133
10. Alloy tool and special steel (1949).	PTB 136
11. Sodium thiosulphate, sodium sulphite and sodium bisulphite (under section 4(1) of the Tariff Act) (1949).	PTB 140
12. Calcium chloride (1949).	PTB 148
13. Grinding wheels (under section 4(1) of the Tariff Act) (1949).	PTB 141
14. Hurricane lanterns (under section 4(1) of the Tariff Act) (1949).	PTB 144
15. Sugar (1949).	PTB 134
16. Preserved fruits (1949).	PTB 143
17. Coated abrasives (under section 4(1) of the Tariff Act) (1949).	PTB 147
18. Antimony (1949).	PTB 161
19. Phosphates and phosphoric acid (1949).	PTB 164

20. Starch (1949).	PTB 163
21. Bichromates (1949).	PTB 168
22. Ferro-silicon (1949).	PTB 169
23. Sewing machines (1949).	PTB 170
24. Cocoa powder and chocolate (1949).	PTB 172
25. Electric motors (1949).	PTB 166
26. Steel belt lacing (1949).	PTB 171
27. Cotton and hair belting (1949).	PTB 173
28. Calcium chloride (1950).	PTB 175
29. Sugar (1950).	PTB 179
30. Potassium permanganate (1950).	PTB 176
31. Wood screws (1950).	PTB 177
32. Dry battery (1950).	PTB 180
33. Oleic acid and stearic acid (1950).	PTB 178
34. Plywood and teacheasts (1950).	PTB 181

## II. PRICE REPORTS

1. Cotton yarn and cloth prices (1948).	PTB 127
2. Paper prices (1948).	PTB 130
3. Fair ex-works prices of superphosphate (1949).	PTB 139
4. Fair retention prices of steel produced by the Tata Iron & Steel Company and the Steel Cor- poration of Bengal (1949).	PTB 135
Ex-works costs of hot metal (Iron for steel making) and fair ex-works prices of pig iron (Basic and foundry grade) (1949).	PTB 137
6. Fair retention prices of steel produced by Mysore Iron & Steel Works, Bhadravati (1949).	PTB 151
7. Fair retention prices of steel produced by the Tata Iron & Steel Company and the Steel Cor- poration of Bengal (1951).	PTB 205

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*All the above reports are available with the Manager of Publications, Civil Lines, Delhi, and the Secretary, Indian Tariff Board, Contractor Building, Nicol Road, Ballard Estate, Bombay I.*